UNIVERSITY OF SOUTH CAROLINA

Gambrell Hall Repairs
(4th Floor HVAC Renovations)

State Project No. H27-6030-FW-B
Bidding Documents
July 22, 2013

MECHANICAL/ELECTRICAL ENGINEERS

RMF ENGINEERING INC.
194 SEVEN FARMS RD., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641
http://www.rmf.com

ARCHITECT

LS3P ASSOCIATES LTD.
701-a LADY STREET
COLUMBIA, SOUTH CAROLINA 29201
PHONE: 803-765-2418
FAX: 803-765-2419
http://www.LS3P.com

STRUCTURAL ENGINEERS

ADC ENGINEERING INC.
7825 BROAD RIVER RD
IRMO, SOUTH CAROLINA 29063
PHONE: 803-732-7080
http://www.adcengineering.com

BUILDING ENVELOPE CONSULTING

ADC ENGINEERING INC.
7825 BROAD RIVER RD
IRMO, SOUTH CAROLINA 29063
PHONE: 803-732-7080
http://www.adcengineering.com

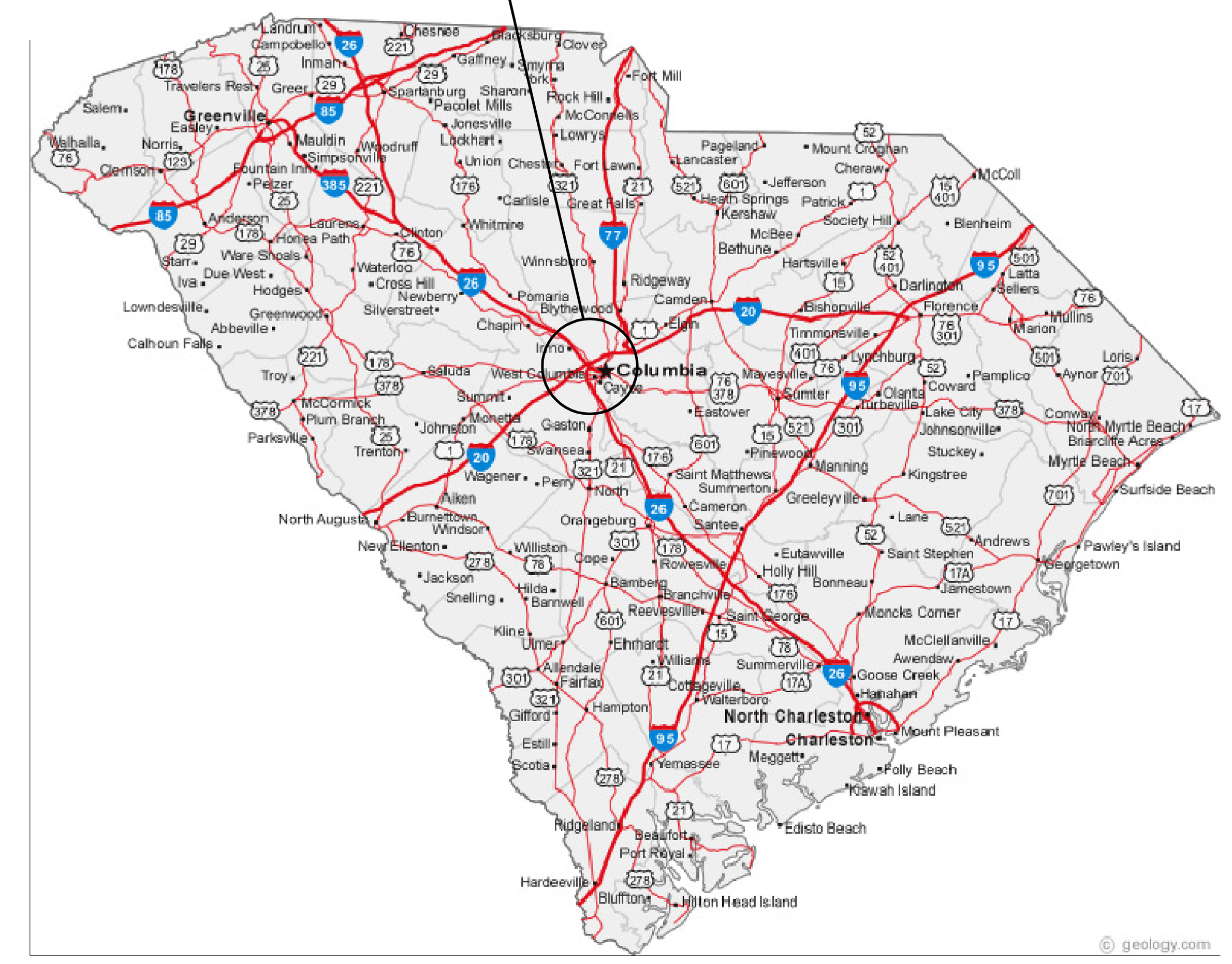
DRAWING INDEX

CODE INFORMATION

PROJECT DESIGNED IN ACCORDANCE WITH:

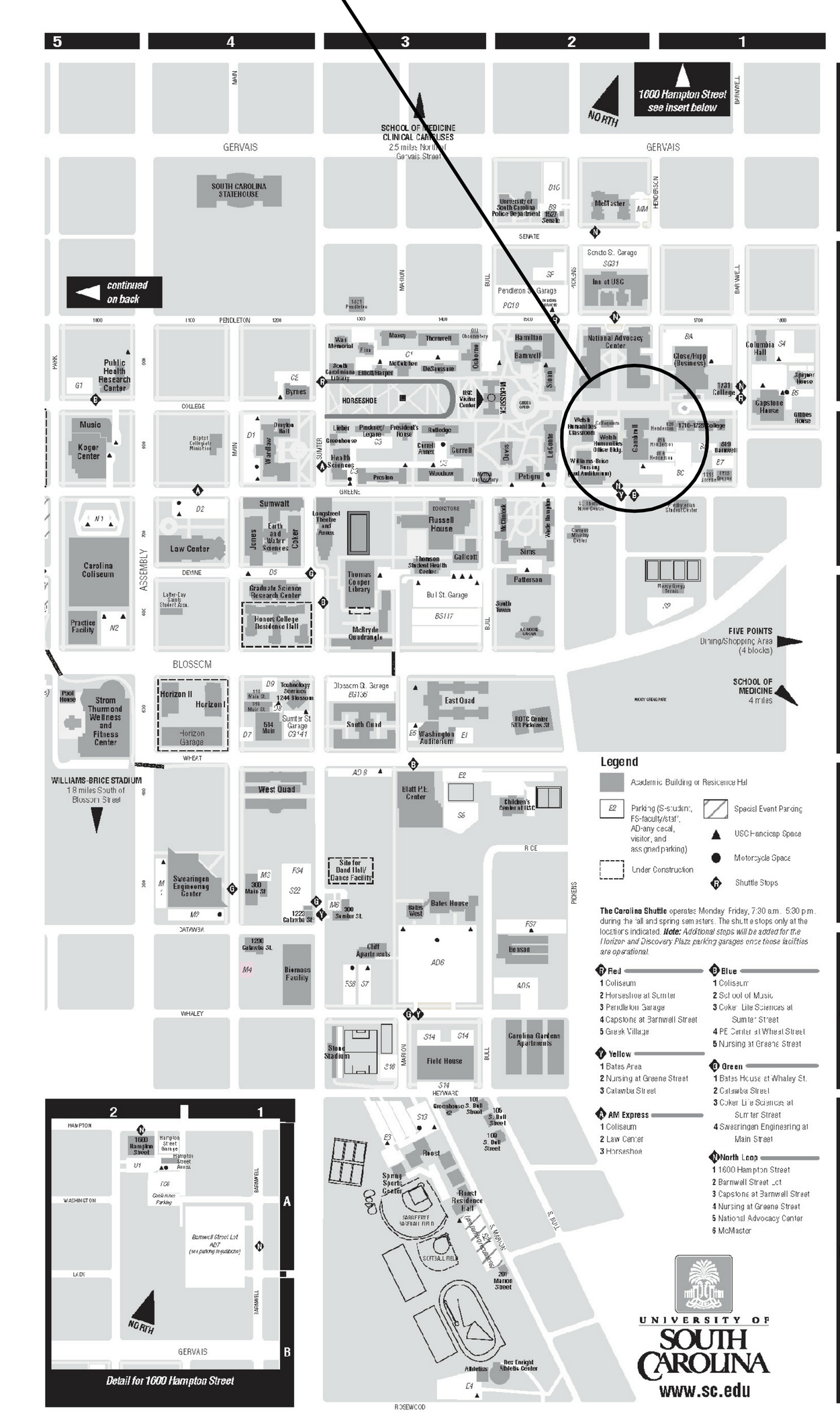
1. INTERNATIONAL BUILDING CODE (IBC), 2009 EDITION
2. INTERNATIONAL EXISTING BUILDING CODE (IBEC), 2009 EDITION
3. INTERNATIONAL FIRE CODE (IFC), 2009 EDITION
4. INTERNATIONAL ENERGY CONSERVATION CODE, 2009 EDITION
5. INTERNATIONAL MECHANICAL CODE (IMC), 2009 EDITION
6. INTERNATIONAL PLUMBING CODE, 2009 EDITION
7. NATIONAL ELECTRIC CODE (NEC) [NFPA–70], 2008 EDITION
8. NATIONAL ELECTRIC SAFETY CODE, ANSI–C2–2007 EDITION
9. STATE FIRE MARSHALL RULES, REGULATIONS, AND POLICIES.

UNIVERSITY OF SOUTH CAROLINA



VICINITY MAP

GAMBRELL HALL



LOCATION MAP

ZONING CERTIFICATION

"I hereby certify that, to the best of my knowledge, these plans comply with applicable zoning ordinances, and that plans have been submitted to appropriate authority for their review and/or approval."

Architect/Engineer ______________________ Date __________

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CHARLESTON, SOUTH CAROLINA 29492
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BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	NONE	DATE:	7/22/13
DRAWN BY:	GTH	RMF JOB NO.:	312307.A0
DESIGNED BY:	BEK	CADD FILE:	
CHECKED BY:	CRB	OSE PROJECT #:	H27–6030–FW–B
PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

TITLE SHEET

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TABLE 5-7 GENERAL FIRE PROTECTION REQUIREMENTS		
SEPARATIONS		
Fireblocking Required	☐ no ☒ yes	per SBC Section 705.3.1, 2305.1
Draftstopping Required	☒ no ☐ yes	per SBC Section 705.3.2, 2305.2
Smoke Control System Required	☒ no ☐ yes	Not Indicated
Smoke Barriers Required	☒ no ☐ yes	per SBC Section 409.1.2, 409.2.14 and 408
Smoke Partitions Required	☒ no ☐ yes	Not Indicated
Fire Partition Required	☒ no ☐ yes	Not Indicated
Fire Barrier Required	☒ no ☐ yes	Not Indicated
ALARM & DETECTION		
Fire Alarm System Required	☒ no ☐ yes	per IFC Section 907
Emergency Alarm System Required	☒ no ☐ yes	per IFC 908
SUPPRESSION		
Standpipes Required	☒ no ☐ yes	per SBC Section 904
Sprinklers Required	☒ no ☐ yes	per SBC Section 903
Sprinklers Provided	☒ no ☐ yes	
Portable Extinguishers Required	☒ no ☒ yes	Not Indicated
Other suppression systems Required	☒ no ☐ yes	Not Indicated
Smoke & heat vents Required	☒ no ☐ yes	Not Indicated
Other: (Indicated other provided fire and life safety features not listed above, if any)		

TABLE 5-3 BASIC BUILDING CODE INFORMATION (BASED ON 1995 ADDITION, 1994 SBC AND IBC 2009)			
CONSTRUCTION CLASSIFICATION	Type IIB	(IBC 602)	
OCCUPANCY GROUP (indicate all) (Note IBC 506.4.1)	Business, GROUP B	(IBC 302)	
OCCUPANCY GROUP (indicate most restrictive)	None Indicated	(IBC Table 503)	
Does building require Incidental Use Area Separation?	☐ no ☒ yes	(IBC 508.2.2)	Not Indicated
Does building have Accessory Occupancy (ies)? What percent of story is accessory occupancy?	☒ no ☐ yes	(IBC 508.3.1)	Not Indicated SF Not Indicated %
Mixed Occupancy	☒ no ☐ yes	(IBC 508.3)	
Non separated	☒ no ☐ yes	(IBC 508.3.2)	
Separated	☒ no ☐ yes	(IBC 508.3.3) (IBC 506.4.1)	

OTHER FIRE PROTECTION SYSTEMS, DEVICES or FEATURES
If the building has any special or notable fire protection or safety feature or hazard the designers should list them here, describe the performance characteristics and refer to locations in construction documents. (e.g. fire extinguishers, smoke-evacuation/control/compartments. Note IBC § 414.1.3)

TABLE 5-8 FIRE RESISTANCE RATING OF BUILDING ELEMENTS

BUILDING ELEMENT	Rating As Required (in hours)	Rating As Designed (in hours)	Testing Agency & Design No. (UL, FM, etc)	Designers Wall/Partition Key Code
Structural Frame (per IBC Table 601)	0	N/A	N/A	N/A
Bearing Walls Exterior Interior (per IBC Table 601)	 0 0	 N/A N/A	 N/A N/A	 N/A N/A
Nonbearing Walls & Partitions Exterior Interior (per IBC Table 601 & 602)	 0 0	 N/A N/A	 N/A N/A	 N/A N/A
Floor Construction including supporting beams & joists (per IBC Table 601)	0	N/A	N/A	N/A
Roof Construction including supporting beams & joists (per IBC Table 601)	0	N/A	N/A	N/A
Fire Walls (per IBC Section 705)	4 HR	N/A	N/A	N/A
Fire Barriers (per IBC Section 706)	2 HR	N/A	N/A - 2 HR rated penetrations through existing boiler room	N/A - 2 HR rated penetrations through existing boiler room
Shaft Enclosures (per IBC Section 707)	N/A	N/A	N/A	N/A
Fire Partitions (per IBC Section 708)	N/A	N/A	N/A	N/A
Opening & Protective Listing by Category (fire shutters, doors, etc. per IBC section 715)	N/A	N/A	N/A	N/A
Others as required by Designer	N/A	N/A	N/A	N/A

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194 SEVEN FARMS DR., SUITE G
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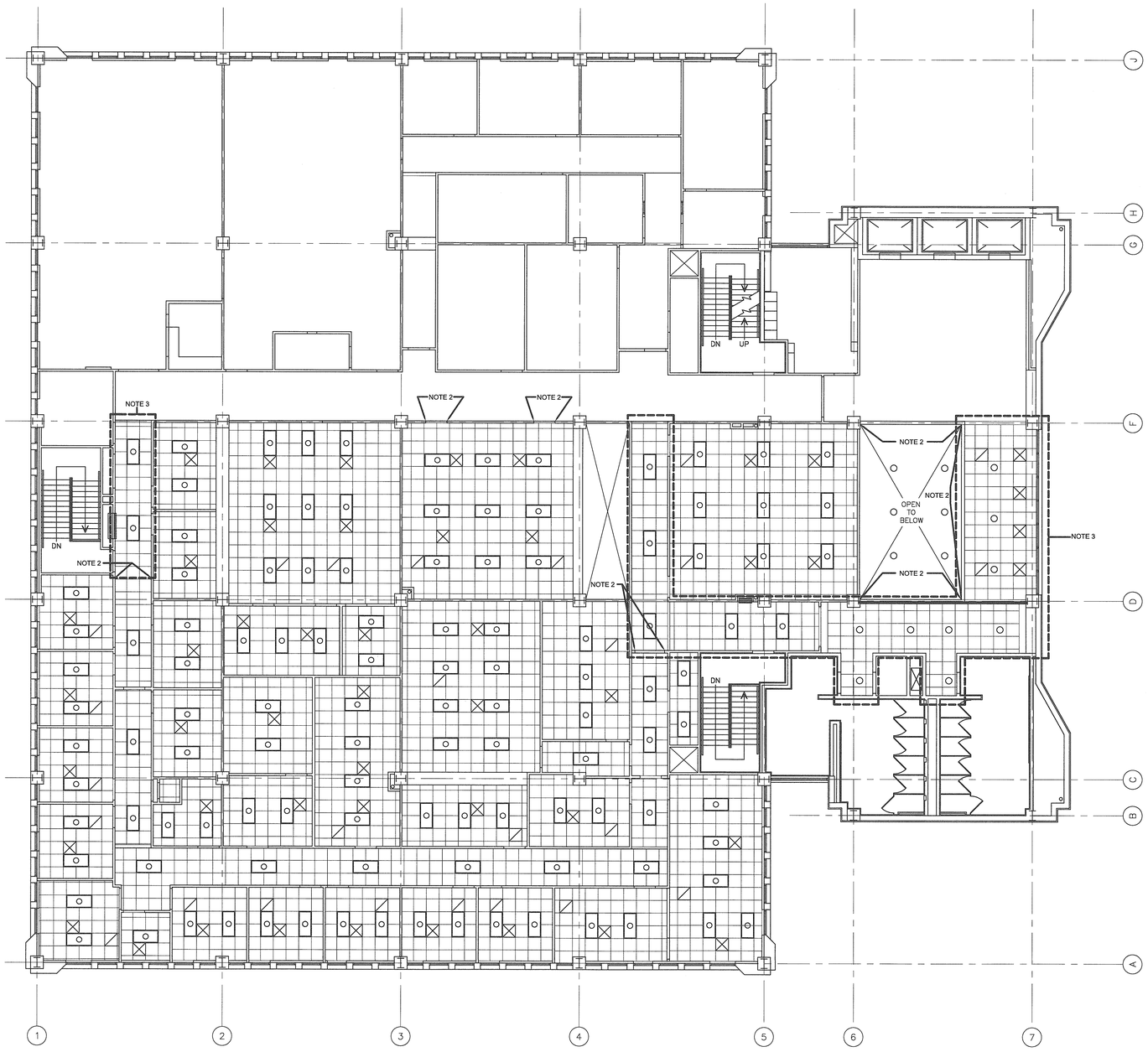
GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

CODE INFORMATION

T1.01



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A-100

FOURTH FLOOR REFLECTED CEILING PLAN

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES

A. IF MATERIALS ARE ENCOUNTERED DURING THE COURSE OF DEMOLITION/ RENOVATION THAT APPEAR TO BE ASBESTOS-CONTAINING MATERIAL, WHICH ARE NOT IDENTIFIED IN THE DOCUMENTS, THEN WORK SHALL STOP IN THAT AREA AND THE OWNER NOTIFIED SUCH THAT THE MATERIAL CAN BE TESTED BY THE OWNER.

B. SEE MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION SCOPE.

C. CUT AND PATCH FLOORS, WALLS AND CEILINGS WHERE REQUIRED TO CONCEAL ANY OF THE FOLLOWING: NEW MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS UNLESS NOTED OTHERWISE. REPAIR TO MATCH ADJACENT FINISHES.

D. ALL EXISTING FLOOR FINISHES AND INTERIOR PARTITIONS/FINISHES ARE TO REMAIN AND BE PROTECTED DURING DEMOLITION AND NEW CONSTRUCTION.

E. ALL DIMENSIONS SHOWN ON THIS SHEET ARE APPROXIMATE, FOR REFERENCE ONLY; CONTRACTOR TO FIELD VERIFY PRIOR TO EXECUTION OFAND NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.

F. SEE MECHANICAL DRAWINGS FOR ANY NECESSARY REMOVAL OF EXISTING EQUIPMENT, LOUVERS, GRILLES, CONTROLS, THERMOSTATS, DUCTWORK, OR OTHER SCOPE NOT NOTED ON THIS DRAWING.

G. SEE ELECTRICAL DRAWINGS FOR ANY NECESSARY REMOVAL OF EXISTING EQUIPMENT, FIXTURES, CONDUIT, PANEL BOARDS, SWITCHES OR OTHER SCOPE NOT NOTED ON THIS DRAWING.

H. SEE DEMOLITION NOTES FOR CEILING ASSEMBLIES/FINISHES THAT ARE TO REMAIN. CEILING ASSEMBLIES/FINISHES THAT ARE TO REMAIN ARE TO BE PROTECTED DURING DEMOLITION AND NEW CONSTRUCTION.

I. PROTECT AND KEEP ALL EXISTING STROBE LIGHTS, SPRINKLER HEADS, ETC.

J. EXISTING WORK TO REMAIN SHALL BE TEMPORARILY SECURED, BRACED AND STABILIZED UNTIL PERMANENT CONSTRUCTION IS IN PLACE.

K. ERECT TEMPORARY BARRICADES OR OTHER SECURABLE MEANS TO PREVENT UNAUTHORIZED ACCESS INTO CONSTRUCTION ZONES.

SHEET NOTES

1. WHERE NEW CEILINGS ARE SHOWN (AS INDICATED IN LEGEND BELOW), REMOVE EXISTING CEILINGS IN THEIR ENTIRETY. INSTALL NEW CEILING AT SAME HEIGHT AS EXISTING. NEW CEILING WILL BE INSTALLED AS REQUIRED TO MEET CLASS "D" SEISMIC DESIGN CATEGORY REQUIREMENTS USING $\frac{5}{8}$" WALL MOLDING. PATCH WALLS AS NEEDED AND PAINT TO MATCH ADJACENT SURFACES.

2. INSTALL DUST PARTITION TIGHT FROM FLOOR TO UNDERSIDE OF FLOOR DECK ABOVE. SEAL TIGHT TO DECK AND AROUND ALL PENETRATIONS. REMOVE AT END OF PROJECT. PATCH AND/OR REPAIR EXISTING CONSTRUCTION AS NEEDED TO MATCH ADJACENT CONSTRUCTION. VERIFY LOCATION WITH OWNER. DUST PARTITION TO BE CONSTRUCTED OF G.W.B. ON METAL STUDS.

3. WORK IN THIS AREA IS TO BE PHASED AND COORDINATED WITH THE OWNER TO PERMIT ACCESS TO EGRESS STAIRS AND GROUP RESTROOMS DURING CONSTRUCTION.

LEGEND

- 0'-0" — HEIGHT (FEET, INCHES) ABOVE FINISH FLOOR
- NEW 2X2 ACOUSTICAL LAY-IN CEILING PANEL TO BE INSTALLED AT SAME ELEVATION AS EXISTING CEILING. SEE NOTE 1
- 1 X 4 FLUORESCENT FIXTURE (LAY-IN)
- 2 X 4 FLUORESCENT FIXTURE (LAY-IN)
- 2 X 2 FLUORESCENT FIXTURE (LAY-IN)
- FLUORESCENT FIXTURE - SURFACE MOUNTED (SEE ELEC. FOR LENGTH)
- FLUORESCENT FIXTURE - PENDANT (SEE ELEC. FOR LENGTH)
- RECESSED ROUND DOWNLIGHT
- SUPPLY AIR DIFFUSER
- RETURN AIR DIFFUSER
- EXHAUST FAN

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194 SEVEN FARMS DR., SUITE G
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PHONE: 843-971-9639
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STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

LS3P ASSOCIATES LTD.
701-A LADY STREET COLUMBIA SC 29201
TEL. 803.765.2418 FAX 803.765.2419
WWW.LS3P.COM

STATE OF SOUTH CAROLINA — LS3P ASSOCIATES LTD. B 74003 COLUMBIA — REGISTERED ARCHITECT

STATE OF SOUTH CAROLINA — DAVID EUGENE ANDERSON Columbia, SC 7672 — REGISTERED ARCHITECT — 7/22/2013

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	1/8"=1'-0"	DATE:	7/22/13
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GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

A-100

ACOUSTICAL PANEL CEILING SPECIFICATION:

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Coordination Drawings: Drawn to scale and coordinating acoustical panel ceiling installation with hanger attachment to building structure and ceiling mounted items:

C. Samples: For each exposed finish

D. Product Test Reports.

E. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:

1. ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."
2. Seismic Category 'D'.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size units equal to 2.0 percent of amount installed.
2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Products: Subject to compliance with requirements, provide products by one of the following:

1. USG Interiors, Inc (Basis of Design: **Radar 'ClimaPlus'**)
2. Armstrong World Industries.
3. BPB-Celotex.

B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

D. Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.

2.2 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural & Seismic classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.

B. Metal Suspension System Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3.

C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
3. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 12 gage wire.

2.3 METAL EDGE MOLDINGS, TRIM AND ACCESSORIES

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard/seismic edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
2. For sprinkler heads and other penetrations, provide oversized ring or sleeve through the ceiling to allow free movement of at least 1/4 inch in all horizontal directions.

2.4 ACOUSTICAL SEALANT

A. Products: Subject to compliance with requirements, provide one of the following:

1. Acoustical Sealant for Exposed and Concealed Joints:
   a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
2. Acoustical Sealant for Concealed Joints:
   a. OSI Sealants, Inc.; Pro-Series SC-175 Rubber Base Sound Sealant.
   b. Pecora Corporation; BA-98.
   c. Tremco, Inc.; Tremco Acoustical Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. Comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counterplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not attach hangers to steel deck tabs.
6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

3.5 ACOUSTICAL PANEL CEILING SCHEDULE

A. Subject to compliance with requirements, provide the Basis-of-Design product indicated, or comparable product approved by Architect from one of the listed manufacturers for each of the following:

B. Acoustical Ceiling:

1. Products: Provide one of the following:
   a. "Radar ClimaPlus," USG Interiors.(Basis-of-Design)
   b. "Fine Fissured with Humiguard Plus," Armstrong World Industries, Inc.
2. Classification: Class 'A' Panels fitting ASTM E 1264 for Type III, mineral base with painted finish; Form 2, water felted.
3. Pattern: Panels fitting ASTM E 1264 pattern designation CE (perforated, small holes and lightly textured).
4. Color: White.
5. Light Reflectance Coefficient: Not less than LR 0.84.
6. Noise Reduction Coefficient: NRC 0.55.
7. Edge Detail: Sloped Tegular. SLT
8. Thickness: 5/8 inch.
9. Size: 24 by 24 inches.

C. Suspension System: Provide ceiling suspension system complying with the following:

1. Products: Provide one of the following:
   a. "Donn DX & DX422 - 2" moldings;" USG Interiors.(Basis-of-Design)
   b. "Prelude XL 15/16" Exposed Tee System;" Armstrong World Industries, Inc.
   c. Provide moldings and seismic accessories as required for Category 'D' installation.
2. Wide-Face, Hot-Dip Galvanized-Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet hot-dip galvanized according to ASTM A 653/A 653M, G60 coating designation, with prefinished, 15/16-inch- wide, aluminum caps on flanges; other characteristics as follows:
   a. Structural Classification: Heavy-duty system.
   b. Face Design: Flush face.
   c. Typical Cap Finish: White.
   d. Aluminum Cap Finish for High Humidity Areas: White.

END OF SPECIFICATIONS

MATERIAL KEYING LEGEND

095113.A	ACOUST PANEL CLG (APC#)
095113.P	CLG SUSPENSION SYSTEM

GENERAL NOTES

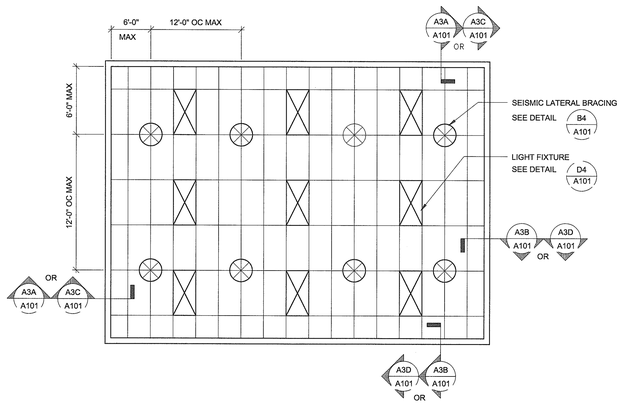
A. CEILING SEISMIC DETAILS ARE PROVIDED TO ILLUSTRATE THE GENERAL REQUIREMENTS OF CISCA'S "GUIDELINES FOR SEISMIC RESTRAINT, SEISMIC DESIGN CATEGORY D AND THE IBC, CHAPTER 16. CONTRACTOR IS RESPONSIBLE FOR MEETING ALL APPLICABLE PROVISIONS OF THESE STANDARDS. IN CASE OF A CONFLICT, THE MORE STRINGENT REQUIREMENT WILL BE ENFORCED.

B. CEILING SEISMIC DETAILS SHOWN ARE FOR CEILING SYSTEMS (INCLUDING ALL DEVICES SUPPORTED BY THE SYSTEM) WITH A COMBINED AVERAGE WEIGHT OF OVER 2.5 LBS/SF.

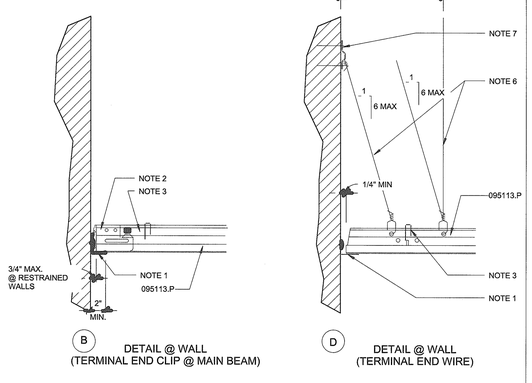
C. DETAILS SHOWN ARE GENERAL DETAILS NOT SPECIFIC TO A MANUFACTURER. PROPRIETARY SEISMIC DETAILS NOT SHOWN MUST BE SUBMITTED BY CONTRACTOR DURING CONSTRUCTION FOR ARCHITECT'S REVIEW.

SHEET NOTES

1. WALL ANGLE. ATTACH TO WALL ONLY.
2. BEAM END RETAINING CLIP.
3. STABILIZER BAR
4. 1/2" DIA S-12 SCREW
5. WALL ANGLE. ATTACH TO RUNNER/TEE & WALL.
6. 12 GA HANGER WIRE. INSTALL EITHER SLOPED OR VERTICALLY WITH MAX SLOPE TO BE 1 IN 6 (10 DEGREES)
7. 18 GA x 3/4" METAL STRAP. ANCHOR TO STUD WALL WITH 20 GA S-12 SCREWS.
8. 12 GA SEISMIC RESTRAINT WIRES. WRAP & TIE @ TOP OF WEB MEMBERS.
9. 12 GA SEISMIC RESTRAINT WIRES. TIE TO METAL STRAP.
10. 18 GA x 3/4" METAL STRAP.
11. NOT USED
12. NOT USED
13. PROVIDE COMPRESSION POST (BY CLG MANUF.) ANCHORED TO MAIN RUNNER & TO STRUCTURE ABOVE.
14. 12 GA HANGER WIRE. CONNECT TO LIGHT FIXTURE & STRUCTURE ABOVE. PROVIDE 2 MIN PER FIXTURE. WIRES MAY BE LEFT SLACK.
15. FIXTURE PROTECTION ENCLOSURE @ FIRE RATED CEILING ASSEMBLIES (IF REQUIRED FOR THIS PROJECT). INSTALL PER REQUIREMENTS OF UL DESIGN NUMBER INDICATED FOR RATED CEILING ASSEMBLY ON SHEET A002.
16. ATTACH FIXTURE TO SUSPENDED GRID SYSTEM OR INDEPENDENTLY SUPPORT FIXTURE FROM STRUCTURE ABOVE.

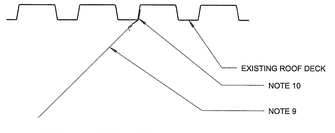


D2 TYPICAL SEISMIC CEILING PLAN
1" = 1"

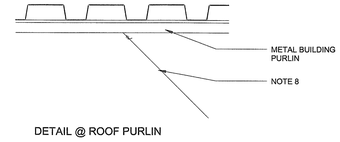


B DETAIL @ WALL (TERMINAL END CLIP @ MAIN BEAM)

D DETAIL @ WALL (TERMINAL END WIRE)

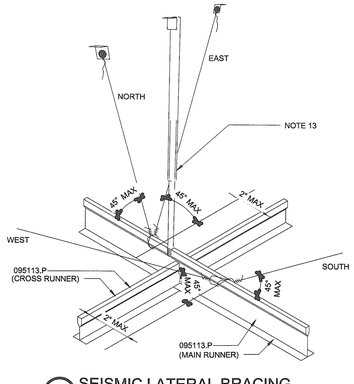


B DETAIL @ STEEL DECK

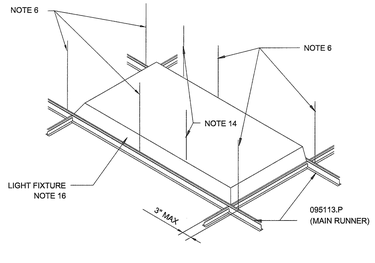


A DETAIL @ ROOF PURLIN

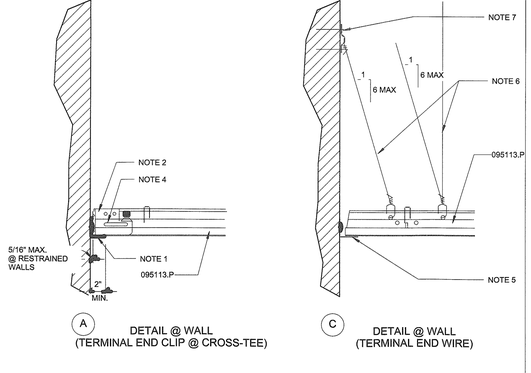
A4 BRACING WIRE CONNECTIONS
12" = 1'-0"



B4 SEISMIC LATERAL BRACING
1" = 1"



D4 LIGHT FIXTURE RESTRAINT
1" = 1"



A DETAIL @ WALL (TERMINAL END CLIP @ CROSS-TEE)

C DETAIL @ WALL (TERMINAL END WIRE)

A2 CEILING GRID SEISMIC DETAILS
12" = 1'-0"

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

RMF ENGINEERING INC. CHARLESTON, SC C-00531

LS3P ASSOCIATES LTD.
701-A LADY STREET COLUMBIA SC 29201
TEL. 803.765.2418 FAX 803.765.2419
WWW.LS3P.COM

DAVID EUGENE ANDERSON Columbia, SC 7872

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	1/8"=1'-0"	DATE:	7/22/13
DRAWN BY:	JL	RMF JOB NO.:	312307.A0
DESIGNED BY:	JL	CADD FILE:	
CHECKED BY:	DA	OSE PROJECT #:	H27-6030-FW-8
PROJ. MGR.:	DA	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

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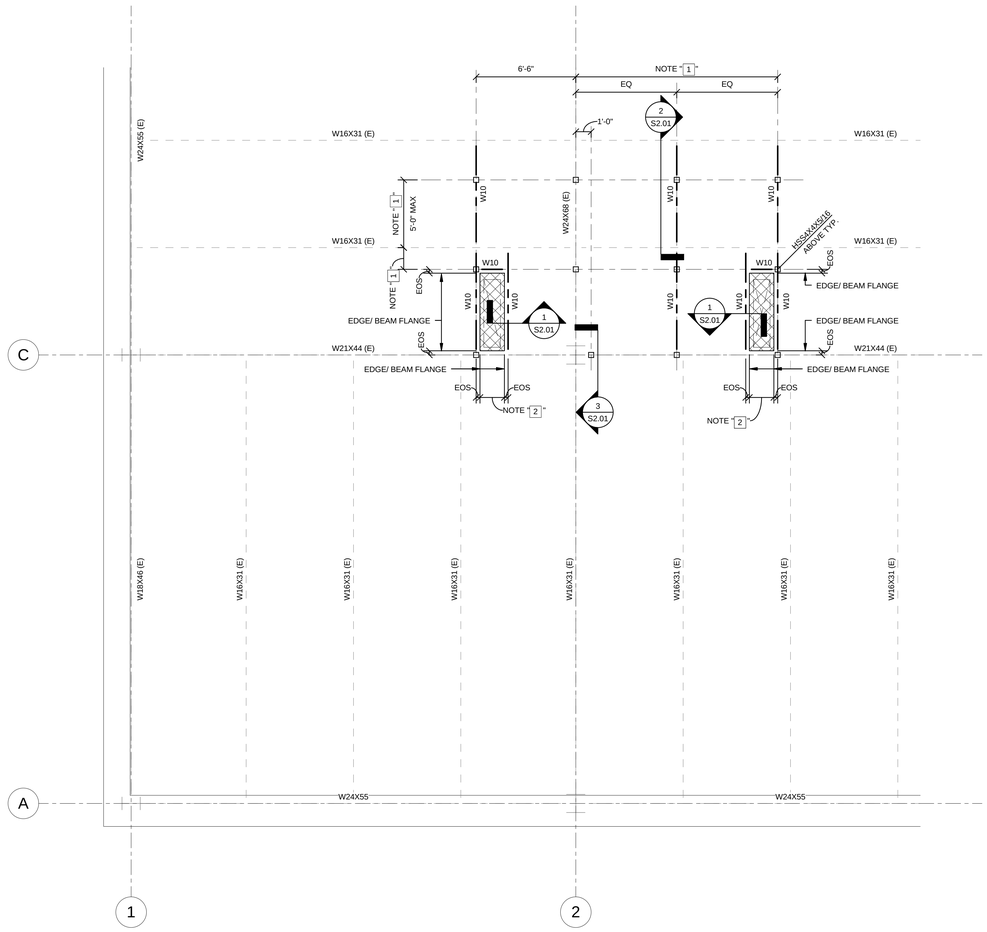
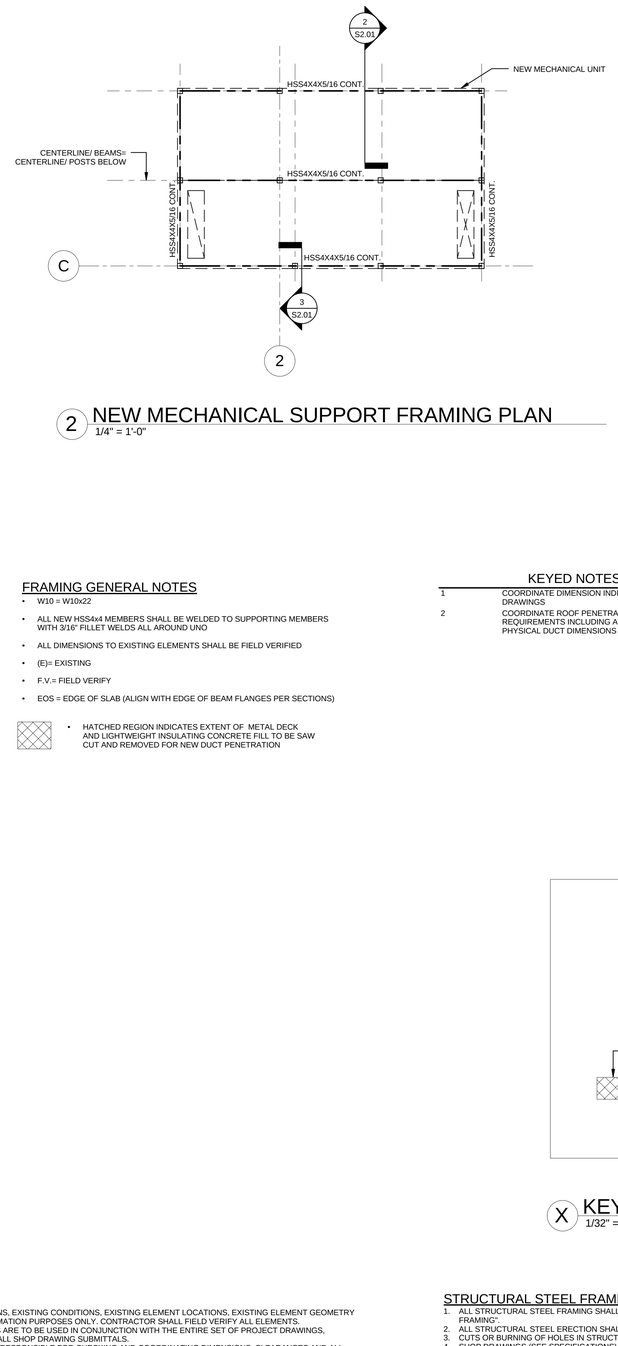
A-101



1 ROOF FRAMING PLAN
1/4" = 1'-0"



2 NEW MECHANICAL SUPPORT FRAMING PLAN
1/4" = 1'-0"

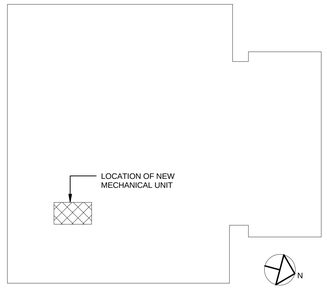
FRAMING GENERAL NOTES

- W10 = W10x22
- ALL NEW HSS4x4 MEMBERS SHALL BE WELDED TO SUPPORTING MEMBERS WITH 3/16" FILLET WELDS ALL AROUND UNO
- ALL DIMENSIONS TO EXISTING ELEMENTS SHALL BE FIELD VERIFIED
- (E)= EXISTING
- F.V.= FIELD VERIFY
- EOS = EDGE OF SLAB (ALIGN WITH EDGE OF BEAM FLANGES PER SECTIONS)

- HATCHED REGION INDICATES EXTENT OF METAL DECK AND LIGHTWEIGHT INSULATING CONCRETE FILL TO BE SAW CUT AND REMOVED FOR NEW DUCT PENETRATION

KEYED NOTES (THIS SHEET ONLY)

1	COORDINATE DIMENSION INDICATED WITH APPROVED MECHANICAL UNIT SHOP DRAWINGS
2	COORDINATE ROOF PENETRATION EXTENTS WITH MECHANICAL DUCT REQUIREMENTS INCLUDING ANY ADDITIONAL CLEARANCE REQUIRED BEYOND PHYSICAL DUCT DIMENSIONS



X KEYPLAN
1/32" = 1'-0"

GENERAL NOTES

1. ALL BUILDING DIMENSIONS, EXISTING CONDITIONS, EXISTING ELEMENT LOCATIONS, EXISTING ELEMENT GEOMETRY SHOWN ARE FOR INFORMATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY ALL ELEMENTS.
2. STRUCTURAL DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE ENTIRE SET OF PROJECT DRAWINGS, PROJECT MANUAL, AND ALL SHOP DRAWING SUBMITTALS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING DIMENSIONS, CLEARANCES AND ALL OTHER COORDINATION ISSUES WITH OTHER TRADES.
4. IN CASE OF CONFLICT BETWEEN VARIOUS STRUCTURAL DRAWINGS, STRUCTURAL PLANS, OR STRUCTURAL DETAILS THE MORE STRINGENT SHALL GOVERN. THE CONTRACTOR SHALL MAKE ALLOWANCE IN HIS BID FOR THE MORE COSTLY CONDITION.
5. WORK NOT INDICATED ON THE DRAWINGS, BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
6. ALL NOTES, DETAILS AND SECTIONS ARE INTENDED TO BE TYPICAL FOR THE GENERAL CONDITIONS INDICATED OR REFERENCED. ALL NOTES, DETAILS AND SECTIONS SHALL APPLY TO ANY SIMILAR SITUATION THROUGHOUT THE ENTIRE PROJECT UNLESS A SEPARATE NOTE, DETAIL OR SECTION IS PROVIDED.
7. REVIEW ALL PROJECT DOCUMENTS PRIOR TO FABRICATION AND START OF CONSTRUCTION. REPORT ANY DISCREPANCIES TO THE OWNER OR OWNER'S REPRESENTATIVE PRIOR TO PROCEEDING WITH WORK.
8. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROTECT EXISTING AND IN PLACE WORK OR UTILITIES DURING CONSTRUCTION
9. COORDINATE STRUCTURAL DRAWINGS WITH OTHER CONTRACT DRAWINGS, SPECIFICATIONS, OR SHOP DRAWINGS WHICH MAY AFFECT THE STRUCTURAL WORK.
10. ALL SUBMITTALS SHALL BE REVIEWED BY THE SUBCONTRACTOR AND CONTRACTOR FOR CONFORMANCE TO THE CONTRACT DOCUMENTS, FOR COMPLETENESS, AND TO RESPOND TO CONTRACTOR COORDINATION RELATED QUESTIONS PRIOR TO SUBMITTING FOR APPROVAL. ALL SHEETS SHALL BE STAMPED AND INITIALED BY THE CONTRACTOR INDICATING SUCH A REVIEW HAS BEEN COMPLETED PRIOR TO ISSUING SUBMITTAL FOR APPROVAL.
11. CONTRACTOR SHALL MAKE NO DEVIATIONS FROM THE CONTRACT DOCUMENTS WITHOUT WRITTEN APPROVAL.

STRUCTURAL STEEL FRAMING

1. ALL STRUCTURAL STEEL FRAMING SHALL CONFORM TO SPECIFICATION SECTION 051200-"STRUCTURAL STEEL FRAMING".
2. ALL STRUCTURAL STEEL ERECTION SHALL COMPLY WITH AISC 360-05 AND AISC 303-05.
3. CUTS OR BURNING OF HOLES IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
4. SHOP DRAWINGS (SEE SPECIFICATIONS) SHALL INCLUDE ALL INFORMATION THAT HAS BEEN PREVIOUSLY FIELD VERIFIED. SHOP DRAWINGS WITHOUT FIELD VERIFICATION WILL NOT BE REVIEWED.

FIELD WELDING

1. ALL FIELD WELDING SHALL CONFORM TO SPECIFICATION SECTION 051200-"STRUCTURAL STEEL FRAMING" FOR WELDING STRUCTURAL STEEL FRAMING
2. ALL FIELD WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1, "STRUCTURAL WELDING CODE-STEEL" AND AWS D1.3, "STRUCTURAL WELDING CODE-SHEET STEEL", LATEST EDITIONS
3. ALL FIELD WELDING SHALL BE IN STRICT ACCORDANCE WITH WRITTEN WELD PROCEDURE (WPS) FOR THE GIVEN WELD CONDITION
4. REPAIR ALL DAMAGED GALVANIZING, PRIMER OR PAINT ONCE WELDING IS COMPLETE
5. ELECTRODES SHALL BE STORED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS
6. ALL PERSONNEL COMPLETING FIELD WELDS SHALL BE CERTIFIED IN ACCORDANCE WITH AWS TO PERFORM THE GIVEN WELD

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

ENGINEERING SPECIALISTS
SITE SERVICES \ BUILDING ENVELOPE \ STRUCTURAL
7825 BROAD RIVER ROAD
SUITE 300
IRMO, SC 29063
803-732-7080
fax 803-732-7090
ADCENGINEERING.COM

SOUTH CAROLINA PROFESSIONAL ENGINEER JAMES B. JONES, JR. No. 22388 7/22/13

ADC ENGINEERING INC NO. 00253 CERTIFICATE OF AUTHORIZATION

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

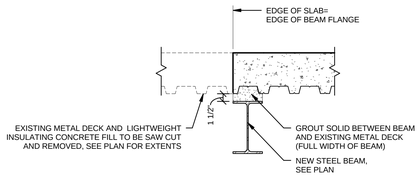
SCALE:	SEE PLAN	DATE:	7/22/13
DRAWN BY:	KMM	ADC JOB NO.:	11210.00
CHECKED BY:	JBJ	OSE PROJECT #:	H27-6030-FW-B

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

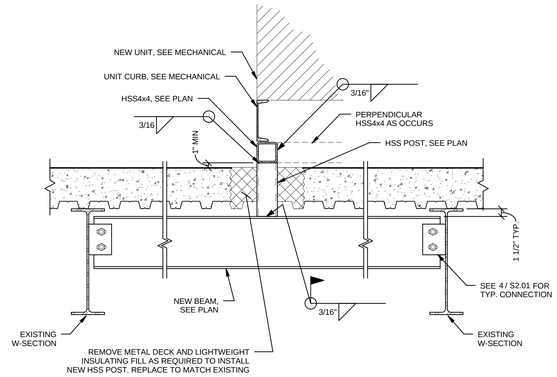
FRAMING PLANS

S1.01

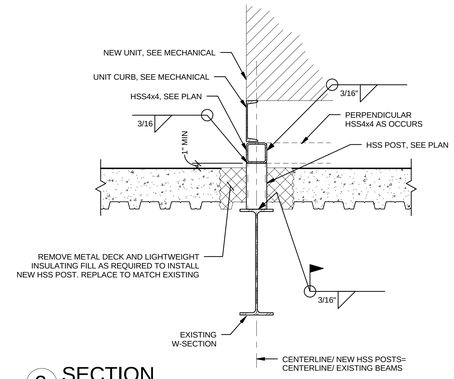


NOTES:
1. THIS DETAIL IS TYPICAL AROUND PERIMETER OF NEW DUCT PENETRATION
2. DETAIL IS SIM. @ EXISTING BEAMS AS NO GROUTING IS REQUIRED BETWEEN BEAM AND SLAB ABOVE

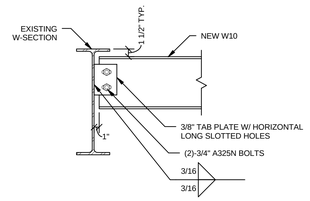
1 SECTION
1" = 1'-0"



2 SECTION
1" = 1'-0"



3 SECTION
1" = 1'-0"



4 TYP. W10 TO EXISTING BEAM CONNECTION
1" = 1'-0"

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

ENGINEERING SPECIALISTS
SITE SERVICES \ BUILDING ENVELOPE \ STRUCTURAL
7825 BROAD RIVER ROAD
SUITE 300
IRMO, SC 29063
803-732-7080
fax 803-732-7090
ADCENGINEERING.COM

SOUTH CAROLINA PROFESSIONAL ENGINEER JAMES B. JONES, JR. No. 22388 7/22/13

ADC ENGINEERING INC NO. 00253 SOUTH CAROLINA CERTIFICATE OF AUTHORIZATION

BIDDING DOCUMENTS

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DRAWN BY:	KMM	ADC JOB NO.:	11210.00
CHECKED BY:	JBJ	OSE PROJECT #:	H27-6030-FW-B

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

SECTIONS & DETAILS

S2.01

CONSTRUCTION NOTES

1. SUBSTRATE SHALL BE INSPECTED AND REPAIRED AS SPECIFIED PRIOR TO SYSTEM INSTALLATION.
2. PROVIDE ALL NEW PRODUCTS AS REQUIRED TO PROVIDE FOR INDICATED DETAILS AND TO MEET SPECIFIED REQUIREMENTS.
3. ROOFING AND SHEET METAL WORK SHALL BE IN STRICT ACCORDANCE WITH THE CONTRACT REQUIREMENTS. ANY CLARIFICATIONS OR ADDITIONAL INFORMATION SHALL BE IN ACCORDANCE WITH PUBLISHED GUIDELINES OF NRCA ROOFING AND WATERPROOFING MANUAL (5th EDITION) AND SMACNA ARCHITECTURAL SHEET METAL MANUAL (6th EDITION).
4. ALL FLASHING TERMINATIONS SHALL HAVE CONFORMING WATERTIGHT SHEET METAL CLOSURES, AND WATERPROOF UNDERLAYMENT ALL SHEETMETAL BELOW W/ SEALED LAPS.
5. ALL WORK SHALL BE CONDUCTED IN A SUBSTANTIAL WORKMANLIKE MANNER IN ACCORDANCE WITH SPECIFIED REQUIREMENTS.
6. INSTALL TAPERED INSULATION CRICKETS TO PROVIDE POSITIVE DRAINAGE ON THE UPSLOPE SIDE OF NEW CURB PENETRATION.
7. WALKPADS ARE REQUIRED AROUND CURB EQUIPMENT.

GENERAL M/E/P AND COORDINATION NOTES

1. COORDINATION WITH MECHANICAL CONTRACTOR IS REQUIRED.
2. BASE FLASHINGS ARE TO BE A MINIMUM 8" ABOVE THE FINISHED ROOF SURFACE.
3. A MINIMUM DISTANCE OF 12 INCHES SHALL EXIST BETWEEN ANY AND ALL PENETRATIONS AND/OR TERMINATIONS.
4. ANY LOCATIONS/CONDITIONS WHERE THE ABOVE REQUIREMENTS CANNOT BE MET, SHALL BE BROUGHT TO THE ATTENTION OF THE ROOF CONSULTANT/ENGINEER OR OWNER IMMEDIATELY.

GENERAL NOTES

1. PRIOR TO PERFORMING WORK, CONTRACTOR SHALL INSPECT DECK SURFACES AND SUBSTRATE CONDITIONS. PROVIDE FOR THE SAFETY AND PROTECTION OF WORKERS AND OCCUPANTS THROUGHOUT THE COURSE OF WORK.
2. ALL BUILDING DIMENSIONS, EXISTING CONDITIONS, ITEM LOCATIONS, AND SIZE AND QUANTITY OF PENETRATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BID.
3. SITE SHALL BE CLEANED ON A DAILY BASIS AND SECURED AT THE END OF EACH WORK DAY.

PROTECTION NOTES

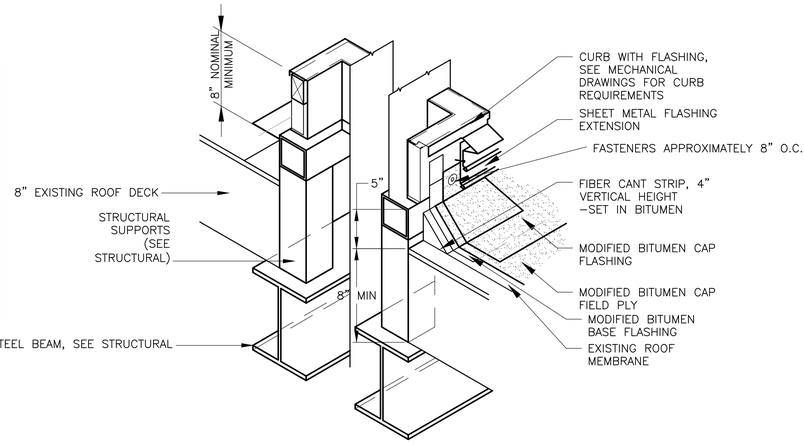
1. FACILITIES MAY BE OCCUPIED DURING CONSTRUCTION. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE FACILITY, CONTENTS, AND OCCUPANTS.
2. THE BUILDING SHALL BE WATERTIGHT AT THE END OF EACH DAY'S WORK AND WHEN INCLEMENT WEATHER THREATENS.
3. CONTRACTOR SHALL PROTECT THE BUILDING EXTERIOR AND GROUNDS INCLUDING SURFACES, GRASS, PLANTS, TREES, SHRUBS, AND OTHER LANDSCAPING. THE CONTRACTOR SHALL RETURN THE SITE AND ANY DAMAGED ITEMS TO ORIGINAL OR BETTER CONDITION.
4. ANY SURFACES STAINED, MARRED, OR DAMAGED BY THE WORK OR THE CONTRACTOR, THE CONTRACTOR SHALL RETURN THE SITE AND ANY DAMAGED ITEMS OF THE SITE OR FACILITY TO ORIGINAL OR BETTER CONDITION AND MATCH ADJACENT SURFACES.
5. WORK SHALL BE SEQUENCED TO MINIMIZE TRAFFIC ON THE NEW WORK. PROTECTION OF THE EXISTING ROOF SYSTEM IS REQUIRED.
6. ASPHALT FUME RECOVERY SYSTEM AND LOW FUMING ASPHALTS ARE REQUIRED AT ALL TIMES.

LEGEND

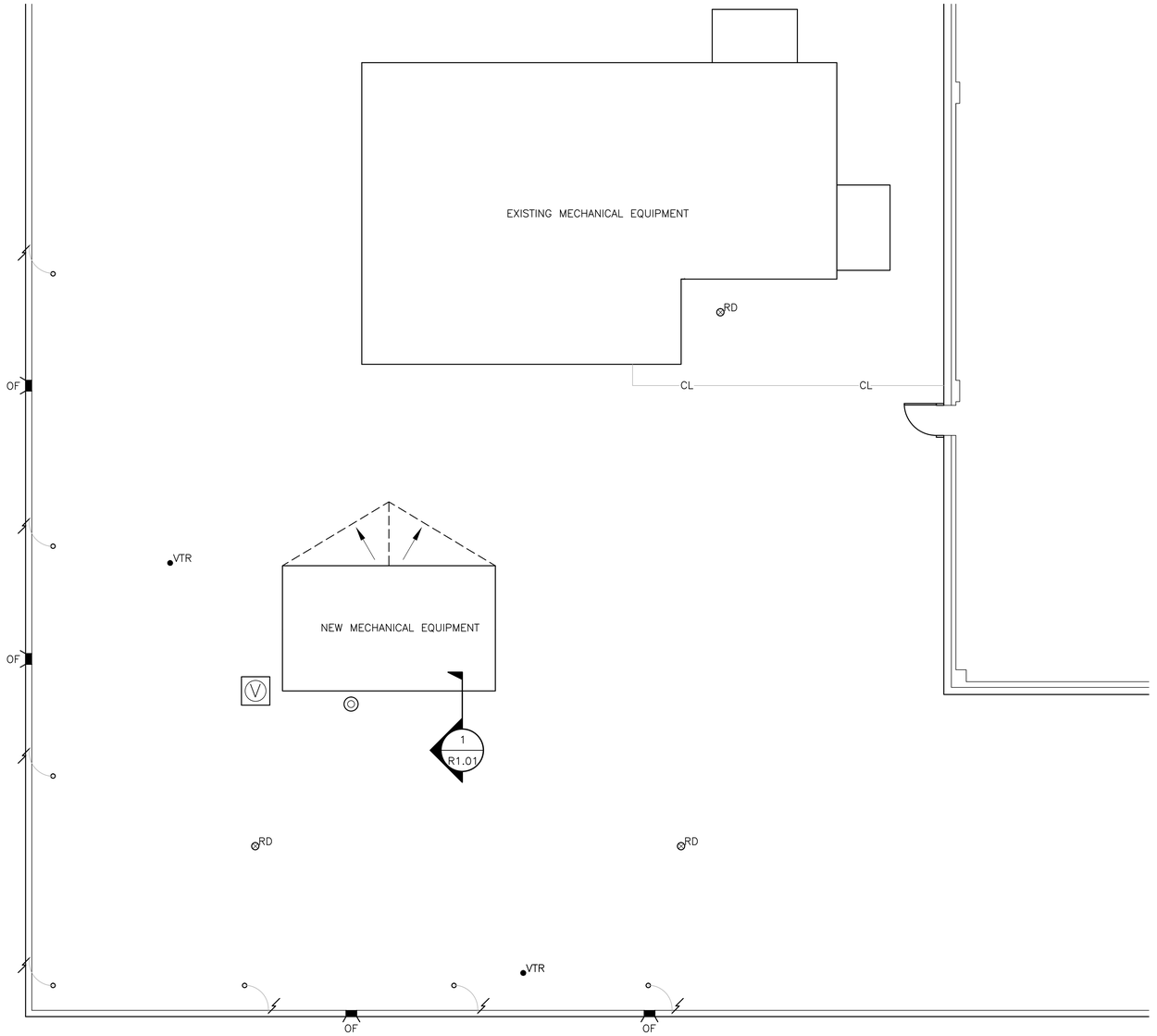
- RD — EXISTING ROOF DRAIN
- VTR — EXISTING VENT THROUGH ROOF
- EXISTING PARAPET WALL
- V — EXISTING VENTILATOR
- EXISTING STACK
- EXISTING PIPE
- TAPER
- OF — EXISTING OVERFLOW SCUPPER
- CL — EXISTING CONDENSATION LINE
- EXISTING LIGHTNING PROTECTION SYSTEM

DEMOLITION NOTES

1. REMOVE EXISTING ROOF SYSTEM IN IT'S ENTIRETY DOWN TO THE EXISTING DECK IN AREAS WHERE NEW PENETRATION IS TO BE INSTALLED. COORDINATION WITH THE MECHANICAL CONTRACTOR IS REQUIRED FOR THE EXACT LOCATION OF NEW EQUIPMENT. AVOID DAMAGING THE ROOF DECK.
2. THE UNDERSIDE (INTERIOR SIDE) OF THE DECK MAY HAVE HVAC, ELECTRICAL FIXTURES, ETC. ATTACHED. THE CONTRACTOR SHALL HAVE QUALIFIED CRAFTSMEN REMOVE AND REINSTALL ALL AFFECTED ITEMS OF THE DEMOLITION OF ROOFING TO COMPLETE THE WORK AND TO REPAIR/REPLACE DECKING. THE LOCATION AND METHOD OF ATTACHMENT SHALL BE THE SAME AS THE ORIGINAL, UNLESS DIRECTED OR APPROVED OTHERWISE BY THE ROOF CONSULTANT AND/OR THE OWNER.
3. ALL DEMOLITION SHALL ADHERE TO ANSI AND OSHA GUIDELINES.



1 / R1.01 NEW MECHANICAL UNIT CURB DETAIL



ROOF PLAN

4' 2' 0 4' 8' 12'

GRAPHIC SCALE

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

ADC ENGINEERING SPECIALISTS
SITE SERVICES \ BUILDING ENVELOPE \ STRUCTURAL
1226 YEAMANS HALL ROAD
HANAHAN, SC 29410
843-566-0161
fax 843-566-0162
ADCENGINEERING.COM

Christopher T. Wells — Roof Consultants Institute — 7/22/13

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE: AS NOTED	DATE: 7/22/13
DRAWN BY: BS	RMF JOB NO.: 312307.A0
DESIGNED BY: CW	CADD FILE:
CHECKED BY: CW	OSE PROJECT #:H27-6030-FW-B
PROJ. MGR.: XXX	CLIENT DWG. #:

GAMBRELL HALL REPAIRS (4TH FLOOR HVAC RENOVATIONS)

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ROOF PLAN

R1.01

GENERAL SYMBOLS

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	PIPE DROP
	PIPE RISE
	PIPE CAP
	BRANCH TAKE OFF
	PIPE DROP TEE
	PIPE RISE TEE
	SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)
	AUTOMATIC CONTROL VALVE (TWO-WAY)
	AUTOMATIC CONTROL VALVE (THREE-WAY)
	BUTTERFLY VALVE
	AUTOMATIC BUTTERFLY VALVE
	BALANCING VALVE (WITH MEMORY STOP)
	UNION
	PIPE FLANGE
	CONCENTRIC REDUCER
FMF	FLOWMETER FITTING
	PRESSURE GAUGE WITH BALL VALVE
	THERMOMETER
	PRESSURE/TEMPERATURE PLUG
	FLOW ARROW

LINETYPE SYMBOLS

DESIGNATION	DESCRIPTION
	DEMOLITION WORK (SHOWN ON DEMOLITION PLANS)
	EXISTING WORK
	FUTURE WORK
	NEW WORK
	MATCHLINE
	PART PLAN DESIGNATION

REFERENCE SYMBOLS

DESIGNATION	DESCRIPTION
XX / X X	FLOOR PLAN NUMBER PARTIAL FLOOR PLAN NUMBER ELEVATION = LETTER DETAIL = NUMBER
	SHEET NUMBER ON WHICH THE PARTIAL PLAN, ELEVATION OR DETAIL IS DRAWN
	SHEET NUMBER WHERE PARTIAL PLAN, ELEVATION OR DETAIL IS TAKEN FROM
XX / X X	SECTION LETTER
	SHEET NUMBER ON WHICH THE SECTION IS DRAWN
	SHEET NUMBER WHERE THE SECTION IS TAKEN FROM
XX.XX / X X	PIPE CONTINUATION DESIGNATION
	SHEET FOR CONTINUATION, SHEET COORDINATES OR PIPE CONTINUATION DESIGNATION LETTER
	SYSTEM CONTINUATION NOTES
N	NORTH ARROW
	POINT OF CONNECTION TO EXISTING
	POINT OF DISCONNECTION

MECHANICAL LEGEND

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
T	THERMOSTAT
	AIR FLOW
CFM	TRANSFER AIR FLOW (INDICATE CFM)
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE
	EXHAUST AIR GRILLE
	AIRFLOW MONITORING DEVICE
	STATIC PRESSURE SENSING STATION
FD	FIRE DAMPER
VD	VOLUME DAMPER
	FLEXIBLE CONNECTION
	HORIZONTAL ACCESS DOOR
	VERTICAL ACCESS DOOR
	ELBOW WITH DOUBLE THICKNESS TURNING VANES
	RECTANGULAR BRANCH TAKE-OFF
	BELL MOUTH BRANCH TAKE-OFF
	ROUND BRANCH TAKE-OFF
	ROUND DUCT DROP OFF BOTTOM
	DUCT TRANSITION
	SQUARE TO ROUND TRANSITION
UP/DN	DUCTWORK CHANGE IN ELEVATION (UP OR DOWN)
	SUPPLY/OUTSIDE AIR DUCT RISER
	RETURN AIR DUCT RISER
	EXHAUST/RELIEF AIR DUCT RISER
	ROUND DUCT RISER (SMALLER THAN 12")
	ROUND DUCT RISER (12" AND LARGER)
X AIR DEVICE TYPE XX CFM	AIR DEVICE IDENTIFIER

PIPING SYMBOLS

SYMBOL	DESCRIPTION
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
CD	CONDENSATE DRAIN
HR	HEATING WATER RETURN
HS	HEATING WATER SUPPLY

EQUIPMENT DESIGNATIONS

SYMBOL	DESCRIPTION
AHU-V-X	AIR HANDLING UNIT DESIGNATION
AMD-X	AIRFLOW MONITORING DEVICE DESIGNATION
CC-X	COOLING COIL DESIGNATION
F-X	FILTER DESIGNATION
RF-X	RETURN FAN DESIGNATION
SA-X	SOUND ATTENUATOR DESIGNATION
SF-X	SUPPLY FAN DESIGNATION
SPSS-X	STATIC PRESSURE SENSOR DESIGNATION
V-X	VALVE DESIGNATION

TEXT SYMBOLS

SYMBOL	DESCRIPTION
&	AND
@	AT
°F	DEGREE(S) FAHRENHEIT
°C	DEGREE(S) CELSIUS
ø	DIAMETER, PHASE
/	DIVIDE BY, PER
$	DOLLAR
=	EQUALS, EQUAL TO
x'	FEET, FOOT
>	GREATER THAN
≥	GREATER THAN OR EQUAL TO
x"	INCH(ES)
<	LESS THAN
≤	LESS THAN OR EQUAL TO
−	MINUS
x	MULTIPLY BY, BY
#	NUMBER, POUND
%	PERCENT
+	PLUS
±	PLUS OR MINUS

MECHANICAL ABBREVIATIONS

NOTE: THIS IS A STANDARD ABBREVIATION LIST. SOME ABBREVIATIONS MAY NOT APPEAR ON THE ACCOMPANYING DRAWINGS.

A	COMPRESSED AIR
AAV	AUTOMATIC AIR VENT
ACV	AUTOMATIC CONTROL VALVE
AD	ACCESS DOOR, AREA DRAIN
AF	ANTIFREEZE
AFF	ABOVE FINISHED FLOOR
AR	ARGON GAS
ATC	AUTOMATIC TEMPERATURE CONTROL
BAS	BUILDING AUTOMATION SYSTEM
BBD	BOILER BLOWDOWN
BCWR	BEARING COOLING WATER RETURN
BCWS	BEARING COOLING WATER SUPPLY
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BMS	BUILDING MANAGEMENT SYSTEM
BO	BLOW OFF
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
°C	DEGREE(S) CELSIUS
CA	CONTROL AIR
CBD	CONTINUOUS BLOWDOWN
CC	CAMPUS CONDENSATE
CCMS	CENTRAL CONTROL AND MONITORING SYSTEM
CD	CONDENSATE DRAIN
CF	CHEMICAL FEED
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CO	CLEANOUT
CO2	CARBON DIOXIDE
CS	CLEAN STEAM
CW	COLD WATER, CITY WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DEEP, DRAIN WATER
DB	DECIBEL, DRY BULB
DDC	DIRECT DIGITAL CONTROL
DHR	DISTRIBUTION HEATING WATER RETURN
DHS	DISTRIBUTION HEATING WATER SUPPLY
DIR	DEIONIZED WATER RETURN
DIS	DEIONIZED WATER SUPPLY
DL	DOOR LOUVER
DN	DOWN
DSP	DRY SPRINKLER PIPE
DTR	DUAL TEMPERATURE RETURN
DTS	DUAL TEMPERATURE SUPPLY
DW	DISTILLED WATER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EJ	EXPANSION JOINT
EMS	ENERGY MANAGEMENT SYSTEM
ESP	EXTERNAL STATIC PRESSURE
ETC	ETCETERA
EVAC	GAS EVACUATION
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
°F	DEGREE(S) FAHRENHEIT
F	FIRE LINE
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER, FOUNDATION DRAIN
FDV	FIRE DEPARTMENT VALVE
FF	FINISHED FLOOR
FFE	FINISHED FLOOR ELEVATION
FIN/FT	FINS PER FEET
FIN/INCH	FINS PER INCH
FM	FLOWMETER
FMF	FLOWMETER FITTING
FOF	FUEL OIL FILL
FOO	FUEL OIL OVERFLOW
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FUEL OIL TRANSFER
FOV	FUEL OIL VENT
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOW SWITCH
FT	FOOT, FEET
FWR	FEED WATER RETURN
FWS	FEED WATER SUPPLY
G	NATURAL GAS
GHR	GLYCOL HEATING RETURN
GHS	GLYCOL HEATING SUPPLY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	AUTOMOTIVE LUBRICATION PIPING
H	HIGH
HB	HOSE BIBB
HED	HOSE END DRAIN VALVE
HP	HORSEPOWER
HPR	HIGH PRESSURE STEAM RETURN
HPS	HIGH PRESSURE STEAM SUPPLY
HR	HEATING WATER RETURN
HRR	HEAT RECOVERY RETURN
HRS	HEAT RECOVERY SUPPLY
HS	HEATING WATER SUPPLY
HT	HEIGHT
HTHR	HIGH TEMPERATURE HEATING WATER RETURN
HTHS	HIGH TEMPERATURE HEATING WATER SUPPLY
HW	HOT WATER
HWR	HOT WATER RECIRCULATION
HZ	HERTZ
IA	INSTRUMENT AIR
ICW	INDUSTRIAL COLD WATER
IHW	INDUSTRIAL HOT WATER
IHR	INDUSTRIAL HOT WATER RECIRCULATION
IN	INCH, INCHES
INV EL	INVERT ELEVATION
KW	KILOWATTS
L	LONG, LENGTH
LA	LABORATORY AIR
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LBS/HR	POUNDS PER HOUR
LN	LIQUID NITROGEN
LP	LIQUID PROPANE
LPG	LIQUID PETROLEUM GAS
LPR	LOW PRESSURE STEAM RETURN
LPS	LOW PRESSURE STEAM SUPPLY
LV	LABORATORY VENT, LABORATORY VACUUM
LW	LABORATORY WASTE
LWT	LEAVING WATER TEMPERATURE
MA	MEDICAL AIR
MAV	MANUAL AIR VENT
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCC	MOTOR CONTROL CENTER
MO	MOTOR OIL PIPING
MOD	MOTOR OPERATED DAMPER
MPR	MEDIUM PRESSURE STEAM RETURN
MPS	MEDIUM PRESSURE STEAM SUPPLY
MV	MEDICAL VACUUM
N	NITROGEN
NA	NOT APPLICABLE
NC	NOISE CRITERIA, NORMALLY CLOSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN, NITROUS OXIDE
NPSH	NET POSITIVE SUCTION HEAD
O	OXYGEN
OA	OUTSIDE AIR
OD	OVERFLOW DRAIN
OED	OPEN ENDED DUCT
OS&Y	OUTSIDE STEM AND YOKE
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PA	PLANT AIR
PC	PUMPED CONDENSATE
PCR	PUMPED CONDENSATE RECIRCULATION
PCHR	PRIMARY CHILLED WATER RETURN
PCHS	PRIMARY CHILLED WATER SUPPLY
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PD	PRESSURE DROP, PUMP DISCHARGE
PGR	PROCESS GLYCOL WATER RETURN
PGS	PROCESS GLYCOL WATER SUPPLY
PH	PHASE
PHR	PRIMARY HEATING RETURN
PHS	PRIMARY HEATING SUPPLY
PIV	POST INDICATING VALVE
PPH	POUNDS PER HOUR
PRV	PRESSURE REDUCING VALVE, PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR, RELIEF AIR
RD	REFRIGERANT DISCHARGE
RH	RELATIVE HUMIDITY
RHR	REHEAT WATER RETURN
RHS	REHEAT WATER SUPPLY
RL	REFRIGERANT LIQUID
ROR	REVERSE OSMOSIS WATER RETURN
ROS	REVERSE OSMOSIS WATER SUPPLY
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RV	RELIEF VENT, REFRIGERANT VENT
RX	REMOVE EXISTING
SA	SUPPLY AIR
SAN	SANITARY, SOIL, WASTE
SCHR	SECONDARY CHILLED WATER RETURN
SCHS	SECONDARY CHILLED WATER SUPPLY
SD	STORM DRAIN, SMOKE DETECTOR
SF	SQUARE FOOT
SHR	SECONDARY HEATING WATER RETURN
SHS	SECONDARY HEATING WATER SUPPLY
SL	SOUND LINING
SP	STATIC PRESSURE
SPR	SPRINKLER LINE
SS	STAINLESS STEEL
SQ FT	SQUARE FOOT
SW	SOFT WATER
ΔT	TEMPERATURE DIFFERENCE
TS	TAMPER SWITCH
TSP	TOTAL STATIC PRESSURE
TWR	TEMPERED WATER RETURN
TWS	TEMPERED WATER SUPPLY
TW	TREATED WATER
TYP	TYPICAL
UCD	UNDERCUT DOOR
UL	UNDERWRITERS LABORATORIES
V	VACUUM, VOLTS
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VPD	VACUUM PUMP DISCHARGE
VSD	VARIABLE SPEED DRIVE
VTR	VENT THROUGH ROOF
W	WATTS, WIDE
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WH	WALL HYDRANT
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

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SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — CRAIG R. BUCK

Jul 23 2013

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GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

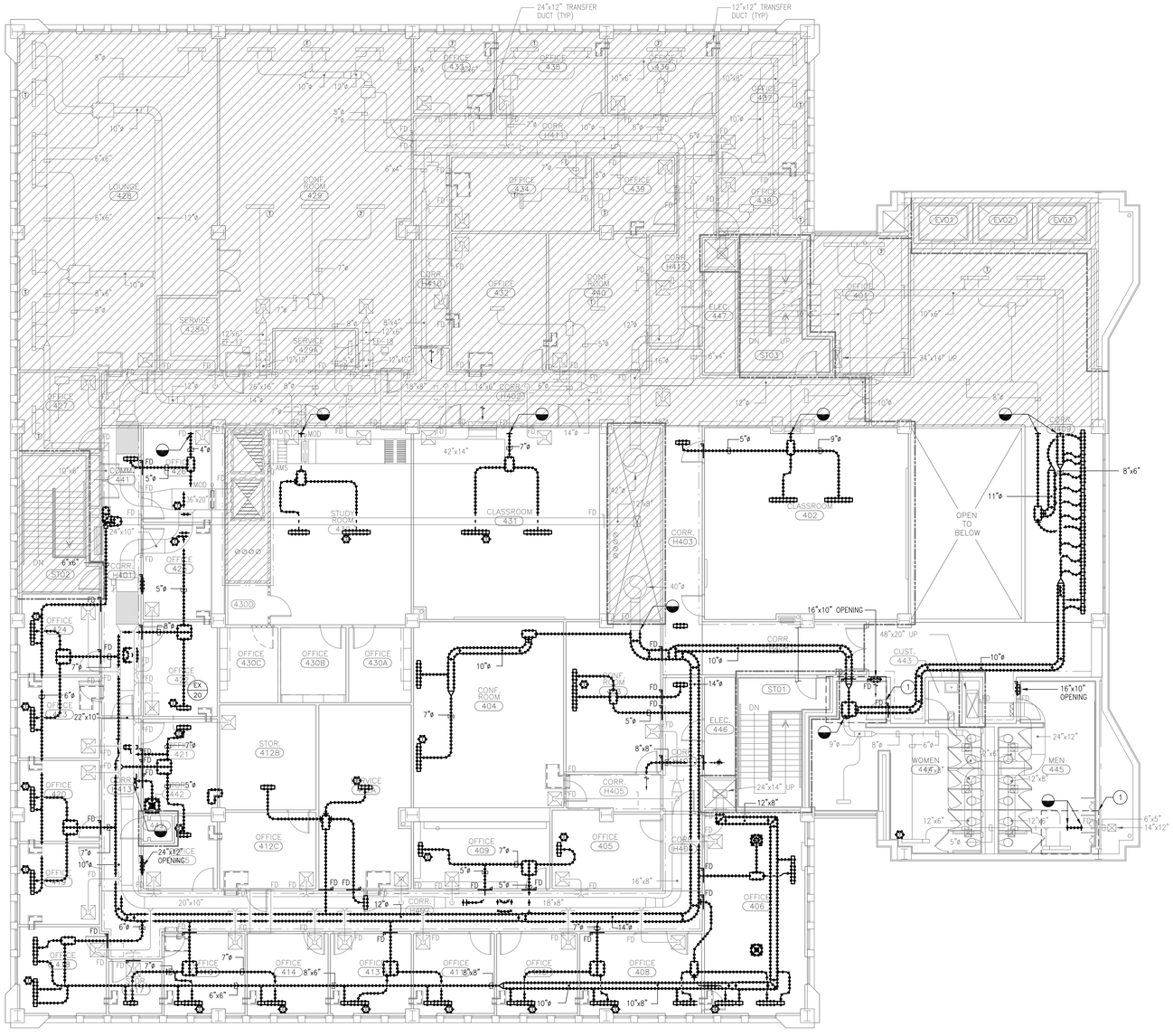
University of South Carolina
Main Campus
COLUMBIA, SC

MECHANICAL LEGEND AND ABBREVIATIONS

M0.01

DRAWING NOTES:

1. PATCH AND PAINT GYP BOARD CEILING TO MATCH EXISTING WHEN WORK IS COMPLETE.



GENERAL DEMOLITION NOTES:

1. NOTIFY THE OWNER, IN WRITING, AT LEAST SEVEN (7) DAYS IN ADVANCE OF ALL REQUIRED SHUTDOWNS OF WATER, FIRE, SEWER, GAS, ELECTRICAL SERVICE, OR OTHER UTILITIES. UPON WRITTEN RECEIPT OF APPROVAL FROM OWNER, SHUTDOWN SHALL BE PERFORMED BETWEEN THE HOURS OF SIX (6) P.M. AND SIX (6) A.M. OR AS DIRECTED OTHERWISE BY THE OWNER AND SHALL BE ACCOMPLISHED AT NO ADDITIONAL CONTRACT COST. AT THE END OF EACH SHUTDOWN ALL SERVICES SHALL BE RESTORED SO THAT NORMAL USE OF THE UTILITIES CAN CONTINUE.
2. WHEN WORKING IN AND AROUND THE EXISTING BUILDING, EXTREME CARE SHALL BE EXERCISED WITH REGARD TO PROTECTION OF THE EXISTING STRUCTURE AND MECHANICAL AND ELECTRICAL SERVICES WHICH WILL REMAIN. REPAIR, REPLACE, OR RESTORE TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER ALL EXISTING WORK DAMAGED IN THE PERFORMANCE OF DEMOLITION AND/OR NEW WORK.
3. ALL EXISTING PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS NOT REQUIRED FOR RE-USE OR RE-INSTALLATION (SHOWN OR OTHERWISE) SHALL BE REMOVED. ALL EXISTING MATERIALS AND EQUIPMENT WHICH ARE REMOVED AND ARE DESIRED BY THE OWNER, OR ARE INDICATED TO REMAIN THE PROPERTY OF THE OWNER, SHALL BE DELIVERED TO HIM ON THE PREMISES BY THE CONTRACTOR. ALL OTHER MATERIALS AND EQUIPMENT WHICH ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR FROM THE PREMISES.
4. EXISTING CONDITIONS, I.E., PRESENCE AND LOCATION OF DUCTWORK, PIPING, EQUIPMENT AND MATERIALS, INDICATED ARE BASED ON INFORMATION OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEYS AND ARE NOT WARRANTED TO BE COMPLETE OR CORRECT. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF ALL DUCTWORK, PIPING, EQUIPMENT AND MATERIALS IN THE FIELD PRIOR TO STARTING ALL WORK.
5. EXISTING DUCT, PIPE, AND EQUIPMENT SIZES NOTED ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND ARE NOT WARRANTED TO BE CORRECT. CONTRACTOR SHALL VERIFY ALL SIZES IN THE FIELD IF THEY EFFECT HIS WORK.
6. EXISTING PIPING NO LONGER REQUIRED TO REMAIN IN SERVICE (SHOWN OR OTHERWISE) SHALL BE DISCONNECTED AND REMOVED BACK TO SERVICE MAINS UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. REMOVE EXISTING PIPE HANGERS, SUPPORTS, VALVES, ETC.. EXISTING PIPING INDICATED OR REQUIRED TO REMAIN IN SERVICE OR IN PLACE SHALL BE CAPPED, PLUGGED, OR OTHERWISE SEALED. NO EXISTING PIPING SHALL BE LEFT OPEN END.
7. EXISTING DUCTWORK INDICATED TO BE DISCONNECTED AND REMOVED SHALL INCLUDE ALL RELATED AIR DEVICES, HANGERS, SUPPORTS, ETC., UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. EXISTING DUCTWORK WHERE INDICATED TO BE CAPPED OR REQUIRED TO REMAIN IN SERVICE SHALL BE CAPPED WITH 18 GAUGE SHEET METAL. SECURE CAP WITH SHEET METAL SCREWS AND SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER. NO EXISTING DUCTWORK SHALL BE LEFT OPEN FOR ANY EXTENDED PERIOD OF TIME. CAP EXISTING DUCTWORK IMMEDIATELY AS REQUIRED OR DIRECTED BY THE ENGINEER. CONTRACTOR SHALL RETURN ALL AIR DEVICES TO OWNER.
8. EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND MATERIALS AFFECTED BY DEMOLITION OR NEW WORK INSTALLATION AND REQUIRED TO REMAIN IN SERVICE SHALL BE RE-INSTALLED OR SUPPORTED AS REQUIRED IN ACCORDANCE WITH NEW WORK SPECIFICATION. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
9. PATCH ALL DISTURBED SURFACES, INCLUDING WALLS, CEILINGS, ROOF, AND FLOOR. PATCHING SHALL MATCH EXISTING ADJACENT SURFACES AS TO THICKNESS, TEXTURE, MATERIALS, AND COLOR. ALL PATCHING SHALL BE PERFORMED TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
10. IN GENERAL ALL PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "LIGHT" IS EXISTING TO REMAIN. ALL PIPING, CONDUITS, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "HEAVY AND DASHED" IS EXISTING TO BE DEMOLISHED.
11. ALL WORK SHALL BE PERFORMED IN A SEQUENCE AND DURING HOURS TO MINIMIZE DISRUPTION TO THE BUILDING WHICH WILL REMAIN OCCUPIED DURING CONSTRUCTION.
12. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SOUTH CAROLINA CODES, CITY OF COLUMBIA, AND THE LOCAL FIRE MARSHALL'S REQUIREMENTS. REFER TO 2009 IBC CHAPTER 33 AND THE USC FIRE MARSHALL.
13. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL OTHER TRADES/ SUBCONTRACTORS INCLUDING BUT NOT LIMITED TO AUTOMATIC TEMPERATURE CONTROLS, ELECTRICAL, AND GENERAL TRADES.
14. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL STAIRWELLS AND EGRESS CORRIDORS DURING CONSTRUCTION.
15. CONCRETE CORING OR CUTTING MAY BE REQUIRED IN ORDER TO RUN MECHANICAL, ELECTRICAL, PLUMBING, CABLING OR OTHER SERVICES TO A SPECIFIC AREA. IT IS IMPERATIVE WHEN CONSIDERING EITHER CORING, CUTTING OR CHIPPING THAT REBAR, PLUMBING, ELECTRICAL SERVICES, ETC WITHIN THE CONCRETE SLAB, WALL OR FLOOR BE LOCATED PRIOR TO DISTURBING THE INTEGRITY OF THE EXISTING CONCRETE. OBTAIN STRUCTURAL DRAWINGS OF THE AREA IN QUESTION AND, USING THE BUILDING GRIDLINES, DETERMINE AND MARK THE EXACT LOCATIONS REQUIRED FOR NEW SERVICES.
16. ALL PENETRATIONS MUST BE SEALED WITH FIRE STOP MATERIAL AFTER SERVICES ARE RUN THROUGH. ALL PENETRATIONS THROUGH EXTERIOR WALLS ABOVE AND BELOW GRADE OR SLAB ON GRADE MUST BE WATERPROOFED.
17. FINAL CEILING HEIGHTS TO BE DETERMINED WITH ENGINEER IN FIELD AFTER DEMOLITION OF EXISTING CEILINGS. NO FABRICATION OF DUCTWORK, HVAC PIPING OR PLUMBING PIPING SHALL BEGIN UNTIL AFTER THE CONTRACTOR HAS COMPLETED COORDINATION DRAWINGS AND ALL CEILING HEIGHTS HAVE BEEN CONFIRMED.
18. AUTOMATIC TEMPERATURE CONTROL CONTRACTOR SHALL DESIGNATE AND NUMBER ALL EQUIPMENT IN ACCORDANCE WITH UNIVERSITY OF SOUTH CAROLINA STANDARDS. NO DUPLICATE DESIGNATION NUMBERS SHALL BE PROVIDED. ALL NUMBERS SHALL BE THE NEXT SEQUENTIAL NUMBER FOR THAT SPECIFIC PIECE OF EQUIPMENT.
19. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO CLOSING ANY CEILINGS FOR A COMPLETE CHECKOUT OF THE HVAC SYSTEM. THE SYSTEM MUST BE COMPLETE AND OPERATIONAL INCLUDING CONTROLS, REGISTERS, INSULATION, AND BALANCING WITH REPORT. THE SYSTEM SHALL BE RUN THROUGH ITS COMPLETE HEATING AND COOLING CYCLES. THE CONTRACTOR AND ALL APPROVED SUBCONTRACTORS SHALL BE PRESENT AT THE ARCHITECT-ENGINEER CHECKOUT. THE TESTING AND BALANCE AGENCY SHALL CERTIFY THAT THESE CONDITIONS ARE MET.
20. PRIOR TO ANY WORK BEING PERFORMED THE CONTRACTOR SHALL PERFORM BASELINE AIR AND PRESSURE READINGS FOR ALL EXISTING AIR HANDLING UNITS. THE READINGS SHALL BE DOCUMENTED AND SUBMITTED AS TO THE ARCHITECT, OWNER AND ENGINEER FOR REVIEW.
21. PRIOR TO ANY WORK MERV 8 FILTER MEDIA SHALL BE PROVIDED OVER ALL OPEN END RETURN AIR DUCTS.
22. ALL FILTERS WITHIN THE EXISTING AIR HANDLING UNIT SHALL BE REPLACED BY THE CONTRACTOR UPON SUBSTANTIAL COMPLETION.
23. THE CONTRACTOR SHALL PROTECT ALL INTERIOR AND ADJACENT SPACES DURING CONSTRUCTION.
24. ALL SPACES WHERE CONSTRUCTION OCCURS SHALL BE CLEANED AND/OR REPAIRED AS NEEDED TO RETURN TO THE SAME OR BETTER CONDITION THAT IT WAS PRIOR TO CONSTRUCTION.
25. ALL CARPETS ON THE FOURTH FLOOR SHALL BE STEAM CLEANED AT COMPLETION OF PROJECT.

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — CRAIG R. BUCK

Jul 23 2013

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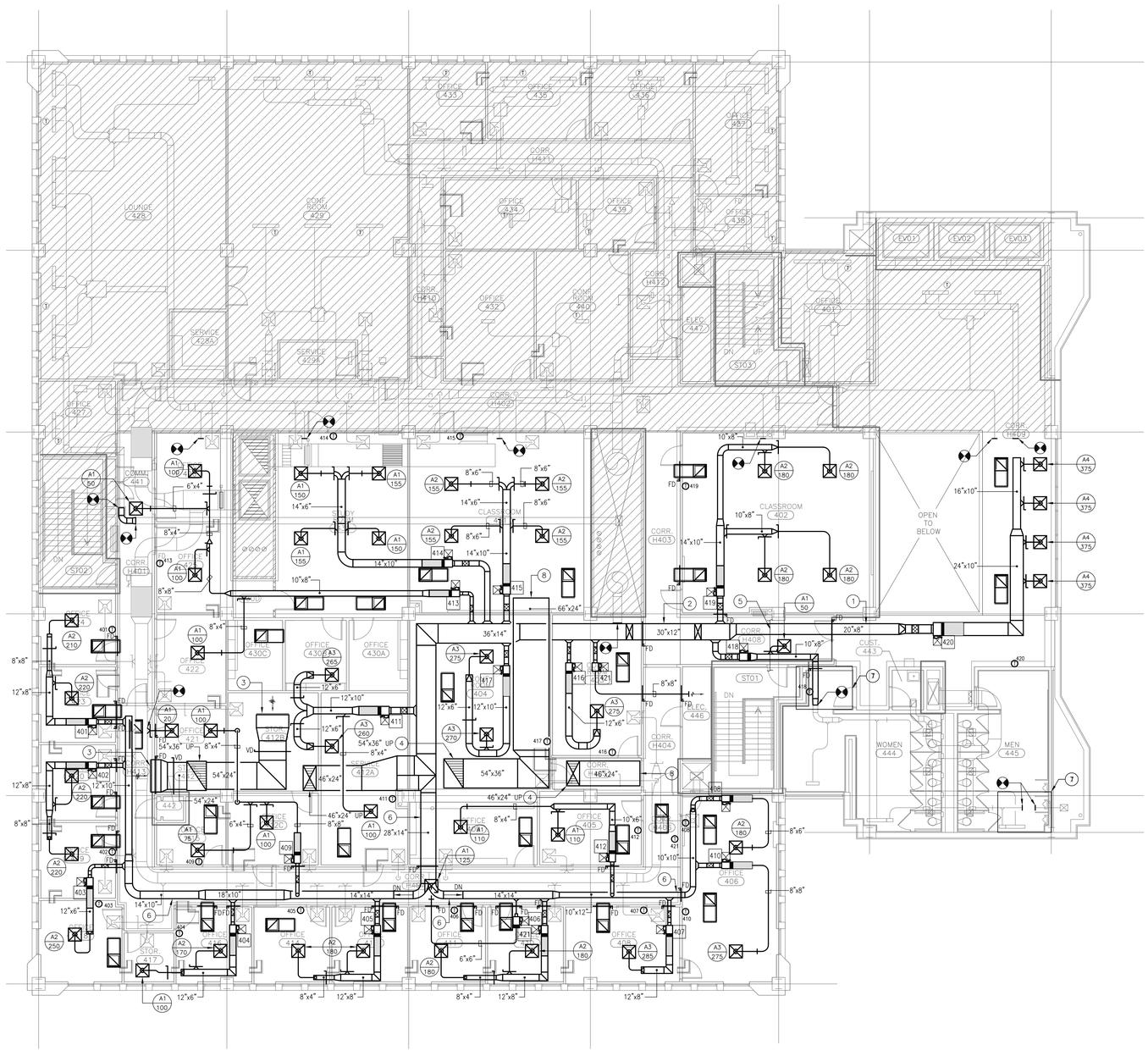
GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

FOURTH FLOOR PLAN – HVAC DEMOLITION

GRAPHIC SCALE
8 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

MD1.01



GENERAL NOTES:

1. UNLESS OTHERWISE INDICATED, RETURN GRILLES SHALL BE 24"x24" TYPE C1 WITH 18"x18" NECK.
2. AIR TERMINAL UNITS SHALL BE INSTALLED PER THE MANUFACTURERS WRITTEN INSTRUCTION. REFER TO AIR TERMINAL UNIT SCHEDULE FOR INLET DUCT SIZES UNLESS OTHERWISE NOTED.
3. ALL OPEN END RETURN AND TRANSFER DUCTS SHALL BE PROVIDED WITH MESH SCREEN OVER OPENING.
4. FULL SIZE ACCESS DOORS SHALL BE PROVIDED IN DUCTWORK TO ALLOW ACCESS TO FIRE DAMPERS.
5. HVAC IN ELECTRICAL/TELECOM ROOMS SHALL BE COORDINATED WITH ALL ELECTRICAL COMPONENTS SUCH THAT INSTALLATION IS COMPLIANT WITH NEC. REFER TO ELECTRICAL DRAWINGS FOR DETAILS.
6. CONTRACTOR SHALL COORDINATE ALL DUCT RISES WITH STRUCTURAL OPENINGS PRIOR TO ANY WORK.
7. ALL WALL MOUNTED THERMOSTATS SHALL BE LOCATED AT THE SAME HEIGHT AS THE LIGHT SWITCH. LOCATION SHALL BE FULLY COORDINATED WITH EXISTING ARCHITECTURAL CASEWORK AND ELECTRICAL.
8. UNLESS OTHERWISE SHOWN OR NOTED ALL TRANSFER DUCTS SHALL BE INSTALLED TIGHT TO STRUCTURE BETWEEN JOISTS.
9. PROVIDE FIRE DAMPERS AT ALL DUCT PENETRATIONS OF ALL FIRE-RATED ASSEMBLIES TO MAINTAIN THE INTEGRITY OF THE ASSOCIATED FIRE- RATED ASSEMBLY.
10. ALL AIR DEVICES SHALL BE PROVIDED WITH A DUCT MOUNTED VOLUME DAMPER FOR BALANCING. DIFFUSER MOUNTED OPPOSED BLADE DAMPERS ARE NOT ACCEPTABLE.
11. REFER TO THE SPECIFICATIONS REGARDING COORDIANTION/INSTALLTION DRAWING REQUIREMENTS.
12. THE DUCTWORK BEING CAPPED FOR FUTURE CONNECTION SHALL BE INSTALLED IN A LOCATION TO ACCEPT AN AIR HANDLING UNIT TO MATCH AHU-4 BEING INSTALLED UNDER THIS PROJECT. REFER TO M1.02 FOR PROPOSED LOCATION OF FUTURE AIR HANDLING UNIT.

DRAWING NOTES:

1. NEW SUPPLY AIR DUCT SHALL ELBOW DOWN UNDER BEAM AND THEN RISE BACK HIGH ONCE CLEAR OF BEAM. NEW SUPPLY AIR DUCT SHALL BE INSTALLED TIGHT TO BEAM WHEN CROSSING BELOW.
2. DUCT SHALL RISE UP AND ROUTED OVER THE TOP OF EXISTING CONDUIT.
3. 60"x24" OPEN END DUCT WITH MESH SCREEN.
4. PROVIDE A TURNED UP ELBOW CAPPED FOR FUTURE CONNECTION.
5. EXISTING 1 1/2" SPRINKLER PIPE INSTALLED 10" ABOVE CEILING GRID.
6. AN EXISTING ROOF DRAIN SYSTEM IS PRESENT IN THIS LOCATION. THE CONTRACTOR SHALL FULLY COORDINATE NEW DUCTWORK INSTALLATION WITH THE EXISTING PIPES.
7. PATCH AND PAINT GYP BOARD CEILING TO MATCH EXISTING WHEN WORK IS COMPLETE.
8. DUCT SHALL BE CAPPED FOR FUTURE CONNECTION.

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

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GAMBRELL HALL REPAIRS (4TH FLOOR HVAC RENOVATIONS)

University of South Carolina Main Campus

COLUMBIA, SC

FOURTH FLOOR PLAN – HVAC NEW WORK

GRAPHIC SCALE
0 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

M1.01

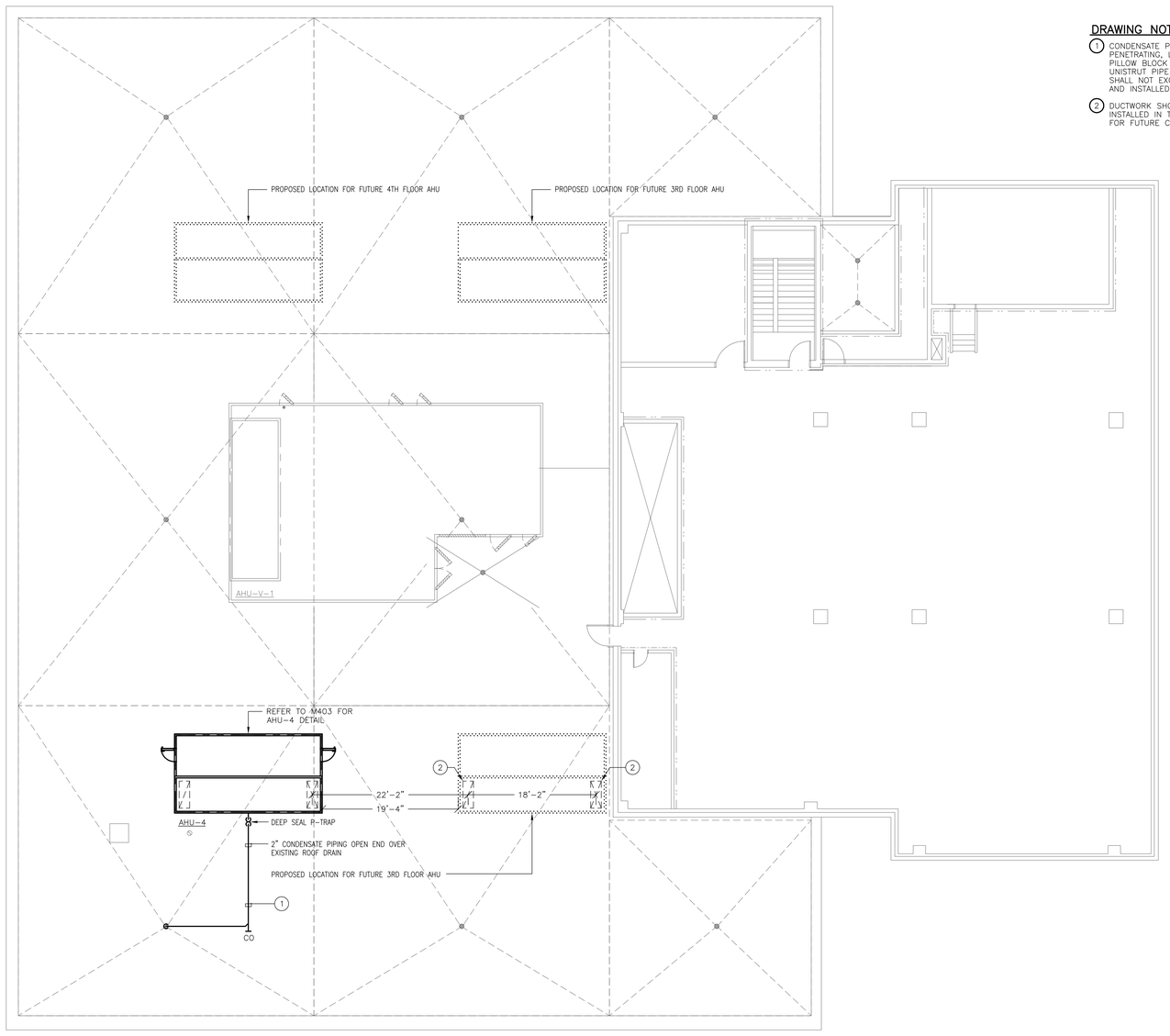
GENERAL NOTES:

1. THE CONTRACTOR SHALL NOT PERFORM ANY CUTTING OR WELDING WITHIN THE AIR HANDLING UNIT OR SERVICE CORRIDOR. ONLY THE WELDS REQUIRED TO MAKE FINAL CONNECTIONS WILL BE PERMITTED INSIDE THE SERVICE CORRIDOR, AND ALL INTERIOR SURFACES SHALL BE PROTECTED WHILE PERFORMING THOSE WELDS. WELDING AND CUTTING SHALL BE PERFORMED ON THE ROOF OR ON THE GROUND.
2. THE EXISTING ROOF SHALL BE PROTECTED FROM DAMAGE CAUSED BY WORKER TRAFFIC, METHODS OF CONSTRUCTION AND MATERIAL LAYDOWN BY COVERING ALL AFFECTED AREAS OF THE ROOF WITH PLYWOOD. THE CONTRACTOR SHALL REPAIR, REPLACE, OR RESTORE TO THE SATISFACTION OF THE UNIVERSITY CONSTRUCTION MANAGER ALL EXISTING ROOF DAMAGED IN THE PERFORMANCE OF DEMOLITION AND/OR NEW WORK.
3. ROOFTOP AIR HANDLING UNITS SHALL BE MOUNTED ON AN INSULATED CERTIFIED SEISMIC ROOF CURB AS MANUFACTURED BY CONN-FAB, PATE, RPS, IMPERIAL METALS OR PRIOR APPROVED EQUAL. TOP OF CURB SHALL BE 16" ABOVE THE FINISHED ROOF SURFACE AND SHALL BE ENGINEERED, CONSTRUCTED AND INTERNALLY REINFORCED TO MEET THE PROJECT SEISMIC CRITERIA AS INDICATED ON THE ARCHITECTURAL AND STRUCTURAL DRAWINGS.
4. THE FUTURE ROOFTOP AIR HANDLING UNITS ARE SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY.

DRAWING NOTES:

(1) CONDENSATE PIPING FROM AHU SHALL BE SUPPORTED ON A NON ROOF PENETRATING, LOW PROFILE PIPE SUPPORT SUCH AS MICRO INDUSTRIES PILLOW BLOCK OR ADVANCED SUPPORT PRODUCTS ECO BLOCK WITH UNISTRUT PIPE CLAMP AND PROTECTION PAD. PIPE SUPPORT SPACING SHALL NOT EXCEED 6 FEET ON CENTER. PIPE STAND SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH MANUFACTURERS WRITTEN INSTRUCTIONS.

(2) DUCTWORK SHOWN ON THIS PLAN FOR INFORMATION ONLY. DUCT SHALL BE INSTALLED IN THE CEILING OF THE FOURTH FLOOR WITH TURNED UP ELBOW FOR FUTURE CONNECTION. REFER TO M1.01 FOR MORE INFORMATION.



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194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
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GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

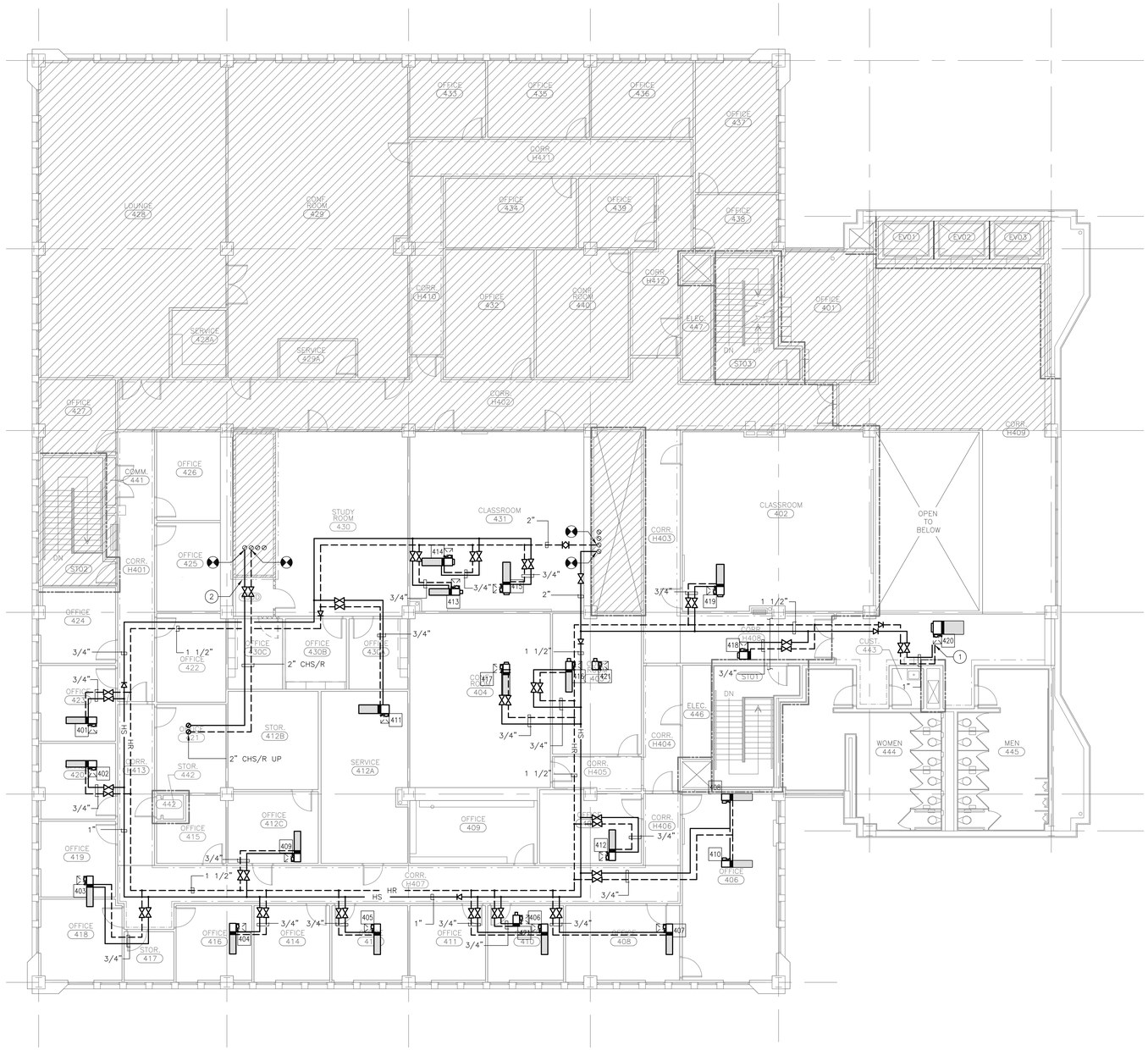
ROOF PLAN – HVAC NEW WORK

GRAPHIC SCALE
8 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

M1.02

DRAWING NOTES:

1. REHEAT COIL PROVIDED WITH A 3-WAY VALVE.
2. CUTTING AND PATCHING OF THE EXISTING WALL WILL BE REQUIRED TO MAKE PIPING CONNECTION. WALL SHALL BE PATCH TO MATCH EXISTING.



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PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS (4TH FLOOR HVAC RENOVATIONS)

University of South Carolina Main Campus

COLUMBIA, SC

FOURTH FLOOR PLAN – HVAC PIPING NEW WORK

GRAPHIC SCALE
8 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

M2.01

INPUT/OUTPUT SUMMARY

POINT NO.	SYSTEM APPARATUS OR AREA POINT DESCRIPTION	INPUTS: ANALOG MEASURED: TEMPERATURE	VELOCITY PRESSURE	STATIC PRESSURE	DIFFERENTIAL PRESSURE	RELATIVE HUMIDITY	CARBON DIOXIDE	ANALOG CALC.: BTU/HR	RUN TIME	FLOW	ENTHALPY	INPUTS: BINARY: STATUS (DIFF. PRESS.)	SAFETY	FREEZESTAT	HIGH HUM. LIMIT	STATUS (AMPS)	END SWITCH	VFD FAULT	HIGH STATIC LIMIT	OUTPUTS: BINARY: START - STOP	DAMPER POSITION	VALVE POSITION	OUTPUTS: ANALOG: DAMPER POSITION	VALVE POSITION	FAN SPEED	WHEEL SPEED	SYSTEM FEATURES: ALARMS: LOW TEMP LIMIT	HIGH DIFF. PRESSURE	FAULT (VFD)	FROST	FAILURE	SMOKE ALARM	PROGRAMS: TIME SCHEDULING	ALTERNATE	TIME DELAY START	OCCUPIED/UNOCCUPIED	TEMPERATURE RESET	MORNING WARM-UP	LEAD/LAG	GENERAL: COLOR GRAPHICS
	AHU-4																																X		X	X	X		X
	SUPPLY FAN SF-4		X						X	X						X		X		X				X				X		X									X
	RETURN AIR	X				X	X								X									X							X								X
	DAMPER D-4-1																X				X									X	X								X
	COOLING COIL CC-4	X																					X																X
	SUPPLY AIR	X		X		X								X					X													X							
	DAMPER D-4-2																X				X									X	X								
	FILTER F-4-1				X																								X									
	FILTER F-4-2				X																								X									

DRAWING NOTES:

1. HARDWIRE TO SF-4 START CIRCUIT.
2. HIGH LIMIT STATIC PRESSURE SWITCH, SET POINT 6" W.G (ADJ.). HARDWIRE TO SF-4 START CIRCUIT.
3. STATIC PRESSURE SENSOR SHALL BE LOCATED IN THE SUPPLY DUCTWORK AT THE POINT(S) OF MINIMUM STATIC PRESSURE (TYPICALLY 2/3 DOWNSTREAM) AND THE INITIAL BALANCED SET POINT DETERMINED THROUGH TEST AND BALANCE.

AHU-4 SEQUENCE OF OPERATION

PART 1 – TEMPERATURE CONTROL SEQUENCES

A. SEE PLANS FOR LOCATIONS OF ALL TEMPERATURE SENSORS, PANELS,DAMPERS, VALVES, AND EQUIPMENT; WHERE SUCH DEVICES ARE NOT INDICATED, HOWEVER REQUIRED BY THE SEQUENCES, THEY SHALL BE PROVIDED BY THE CONTRACTOR AS PART OF THE CONTRACT AND LOCATED IN THE FIELD BY THE ARCHITECT.

B. A FULL COMMUNICATIONS INTERFACE AND COMPLETE INTEROPERABILITY WITH THE EXISTING CAMPUS JOHNSON CONTROLS (JCI) DDC AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED TO PERFORM THE FUNCTIONS HEREIN DESCRIBED OR INDICATED IN THE CONTRACT DOCUMENTS. ALL TEMPERATURE, HUMIDITY, CARBON DIOXIDE, PRESSURE AND TIME SET POINTS SHALL BE FULLY ADJUSTABLE FROM THE BAS.

PART 2 – MASTER HEATING AND COOLING CONTROL

A. BAS SHALL NORMALLY CONTROL THE SYSTEM HEATING AND COOLING MODES AS SELECTED ACCORDANCE WITH OUTDOOR AIR TEMPERATURE THROUGH BUILDING GLOBAL OUTDOOR AIR SENSOR. ON A RISE IN OUTDOOR AIR TEMPERATURE TO FIFTY (50) DEGREES FAHRENHEIT (ADJUSTABLE) AND ABOVE, SYSTEMS SHALL OPERATE IN THE COOLING MODE. ON A FALL IN OUTDOOR AIR TEMPERATURE BELOW FIFTY (50) DEGREES FAHRENHEIT SYSTEMS SHALL OPERATE IN THE HEATING MODE.

B. CONTROL POINT ADJUSTMENT FOR "HEATING" AND "COOLING" CHANGEOVER TEMPERATURE SHALL BE BY THE BAS.

C. WHERE USED TO CONTROL BOTH COMFORT HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEAD BAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

PART 3 – AIR HANDLING UNIT CONTROL

A. SYSTEM CONTROL

1. SUPPLY FAN SHALL BE MANUALLY INDEXED TO THE AUTOMATIC MODE AT ITS RESPECTIVE VARIABLE FREQUENCY DRIVE.
2. THE AIR HANDLING UNIT SHALL BE ENERGIZED VIA REMOTE SIGNAL FROM THE BAS. THE BAS SHALL DETERMINE AND OPERATE THE UNIT ON AN OPTIMAL OCCUPIED AND UNOCCUPIED SCHEDULE WITH A 365 DAY/24 HOUR GRAPHIC INTERFACE SCHEDULE PROGRAM.
3. WHEN THE UNIT IS DEENERGIZED THROUGH THE BAS, ALL CONTROLS SHALL RETURN TO THEIR NORMAL POSITION READY FOR RESTARTING. COOLING COIL VALVE V-4-1 SHALL BE CLOSED. RETURN AIR DAMPER D-4-1 SHALL BE OPEN. SMOKE ISOLATION DAMPERS SHALL REMAIN UNDER CONTROL OF THE SMOKE DETECTION SYSTEM.
4. WHEN SUPPLY FAN SF-4 IS SOFT STARTED TO MINIMUM SPEED THROUGH THE BAS ONCE SMOKE ISOLATION DAMPERS D-4-1 AND D-4-2 HAVE BEEN PROVEN OPEN. UPON A FAILURE OF DAMPERS D-4-1 AND D-4-2 TO OPEN, THE AIR HANDLING UNIT SHALL BE DEENERGIZED AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.
5. THE SUPPLY FAN SF-4 SPEED SHALL BE MODULATED VIA THE VFD TO MAINTAIN SYSTEM STATIC PRESSURE SET POINT AS SEEN BY SPT-4-2. THE SUPPLY FAN SHALL BE PROVIDED WITH A HIGH LIMIT CONTROL FUNCTION WHICH SHALL LIMIT THE CFM OF THE FAN TO 115% OF ITS SCHEDULED QUANTITY. THE HIGH LIMIT CONTROL FUNCTION SHALL OVERRIDE SYSTEM STATIC PRESSURE CONTROL, AND SHALL DEENERGIZE THE SUPPLY FAN IF THE CFM EXCEEDS THE HIGH CFM LIMIT.
6. THE SYSTEM STATIC PRESSURE SET POINT SHALL BE RESET IN ACCORDANCE WITH ASHRAE STANDARD 90.1–2007, AS FOLLOWS: THE STATIC PRESSURE SET POINT SHALL BE RESET BASED ON THE WORST CASE SUPPLY AIR TERMINAL AIR REGULATOR POSITION, I.E. THE SYSTEM STATIC PRESSURE SET POINT SHALL BE RESET EVERY ONE (1) HOUR TO MAINTAIN AT A MINIMUM (1) AIR TERMINAL AIR VOLUME REGULATOR AT 90% OPEN POSITION WITH NO AIR TERMINAL AIR VOLUME REGULATORS EXCEEDING 95% OPEN.
7. A FAILURE OF THE SUPPLY FAN AS SENSED BY ITS RESPECTIVE CURRENT TRANSDUCER SHALL BE ALARMED TO THE BAS. UPON SENSING FAILURE, THE BAS SHALL INDICATE ALARM, DISABLE THE FAN AND RETURN ALL CONTROLS TO THEIR NORMAL POSITION.
8. STATIC PRESSURE SWITCH (SPT–4–1) SHALL ANNUNCIATE AN ALARM AT THE BAS AND DEENERGIZE THE SUPPLY FAN WHEN THE HIGH STATIC PRESSURE SET POINT IS REACHED (6" W.G. – ADJUSTABLE).
9. COOLING COIL VALVE V–4–1 SHALL FAIL CLOSED TO THE COOLING COIL (NC).

C. COOLING MODE

1. COOLING COIL VALVE V–4–1 SHALL BE OPEN TO THE COOLING COIL DURING THE COOLING MODE.
2. OCCUPIED MODE: SUPPLY FAN SHALL BE RUNNING; SMOKE/ISOLATION DAMPERS D–4–1 AMD D–4–2 SHALL BE OPEN.
3. UNOCCUPIED MODE: THE BAS SHALL DETERMINE THE UNOCCUPIED MODE BASED ON A 365 DAY/24 HR GRAPHIC INTERFACE SCHEDULER PROGRAM. THE AIR HANDLING UNIT SHALL BE DEENERGIZED WHEN THE UNOCCUPIED MODE IS INITIATED. THE SUPPLY FAN SHALL BE ENERGIZED WHEN OUTDOOR AIR TEMPERATURE, AS SEEN BY GLOBAL OUTDOOR AIR TEMPERATURE SENSOR, RISES ABOVE 90 DEGREES FAHRENHEIT AND ANY TWO ROOM TEMPERATURES RISE ABOVE THE INCREASED UNOCCUPIED TEMPERATURE SET POINT OF 85 DEGREES FAHRENHEIT (ADJUSTABLE). DAMPER POSITIONS SHALL BE IDENTICAL TO "COOL–DOWN MODE". THE AIR HANDLING UNIT SHALL BE DEENERGIZED WHEN THE TEMPERATURE IN ALL ZONES REACHES A MAXIMUM OF 82 DEGREES FAHRENHEIT (ADJUSTABLE).
4. COOL–DOWN MODE: THE BAS SHALL DETERMINE THE COOL–DOWN MODE START AND STOP TIMES BASED ON A 365 DAY/24 HR GRAPHIC INTERFACE SCHEDULER PROGRAM. SUPPLY FAN SHALL START WHEN THE UNIT IS INDEXED TO COOL–DOWN MODE BY THE BAS, DAMPER D–4–1, AIR TERMINAL UNIT AIR REGULATORS SHALL OPEN TO COOLING POSITION. WHEN THE SECOND WARMEST TERMINAL UNIT SPACE TEMPERATURE SENSOR REACHES THE COOL–DOWN SETPOINT OF 80 DEGREES FAHRENHEIT, THE SYSTEM SHALL BE CONTROLLED AS INDICATED IN OCCUPIED MODE. THE MECHANICAL, BALANCING AND CONTROLS CONTRACTORS SHALL DETERMINE THE WARM–UP MODE SUPPLY FAN AIRFLOW SETPOINTS TO PREVENT EXCESS SYSTEM NEGATIVE PRESSURE AND DAMAGE TO THE RETURN AIR DUCTWORK SYSTEM.
5. RETURN AIR HUMIDITY SENSOR HS–4–1 SHALL OVERRIDE DISCHARGE AIR SENSOR TS–4–5 WHEN THE RETURN AIR RH REACHES SIXTY (60) PERCENT (ADJUSTABLE). COOLING COIL CONTROL VALVE V–4–1 SHALL BE OPENED FULL TO THE COIL TO LOWER THE SUPPLY AIR TEMPERATURE. WHEN THE RETURN AIR RELATIVE HUMIDITY, AS SEEN BY HS–4–1 DROPS BELOW FIFTY–FIVE (55) PERCENT, CONTROL OF COOLING COIL VALVE V–4–1 SHALL BE RETURNED TO DISCHARGE TEMPERATURE SENSOR TS–4–5.

D. SMOKE CONTROL

1. ANY AIR DISTRIBUTION (HVAC) SMOKE DETECTOR SHALL, ON THE DETECTION OF PRODUCTS OF COMBUSTION, SHUT DOWN THE RESPECTIVE SUPPLY AND RETURN FANS SERVING THAT DISTRIBUTION SYSTEM AND CLOSE ALL SYSTEM DAMPERS IN ACCORDANCE WITH NFPA–90A. ALL HVAC SMOKE DETECTORS SHALL BE CONNECTED TO THE FIRE ALARM SYSTEM, AS A SUPERVISORY ALARM ONLY, IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA–72 – NATIONAL FIRE ALARM CODE.
2. UPON AN INITIATION SIGNAL FROM THE FIRE ALARM SYSTEM, THE AIR HANDLING UNIT AND ALL ASSOCIATED SYSTEM EXHAUST FANS SHALL DEENERGIZE AND AN ALARM SHALL BE ANNUNCIATED AT THE BAS.

E. FILTERS

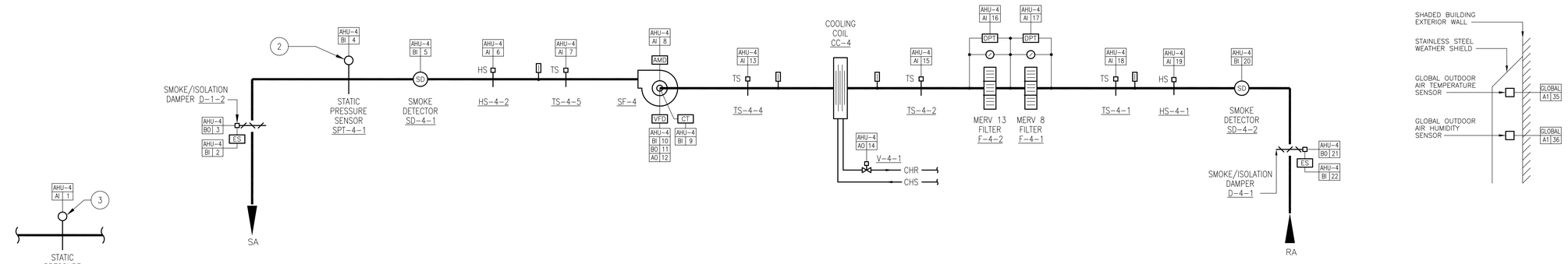
1. DIFFERENTIAL PRESSURE TRANSMITTER INSTALLED ACROSS THE FILTER BANK SHALL ALARM THE BAS WHEN THEIR RESPECTIVE SETTINGS (ADJUSTABLE) ARE REACHED. INITIAL HIGH DIFFERENTIAL PRESSURE SET POINTS SHALL BE PER FILTER MANUFACTURER'S RECOMMENDATIONS.

F. ALARMS & FAILURE MODES

1. A FAILURE OF THE SUPPLY FAN, AS SENSED BY ITS CURRENT TRANSDUCER, SHALL BE ALARMED TO THE BAS. UPON SENSING FAILURE, THE BAS SHALL INDICATE ALARM, DISABLE THE FAILED FAN AND RETURN ALL CONTROLS TO THEIR NORMAL POSITION.

H. PROGRAMS

1. OPTIMAL SUPPLY AIR TEMPERATURE RESET SCHEDULE SHALL BE INCORPORATED WHICH SHALL MINIMIZE THE OVERALL HEATING ENERGY, COOLING ENERGY AND FAN POWER CONSUMPTION WHILE MAINTAINING DESIGN TEMPERATURE AND HUMIDITY CONDITIONS.



AHU–4 SYSTEM SCHEMATIC AND CONTROL DIAGRAM

SCALE: NONE

TERMINAL UNIT SEQUENCE OF OPERATION

A. THE VARIABLE VOLUME AIR TERMINAL SHALL OPERATE ON AN OCCUPIED/UNOCCUPIED SCHEDULE. OCCUPIED/UNOCCUPIED MODES SHALL BE AS DETERMINED BY THE OCCUPIED/UNOCCUPIED PROGRAM OF THE BUILDING AUTOMATION SYSTEM (BAS).

B. OCCUPIED MODE

1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL MODULATE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SET POINT. ON A DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED SPACE TEMPERATURE SET POINT, THE AIR VOLUME REGULATOR SHALL MODULATE TOWARD IT'S MINIMUM POSITION SET POINT.
2. ON A RISE IN TEMPERATURE ABOVE THE OCCUPIED SET POINT, THE REVERSE SHALL OCCUR.

C. UNOCCUPIED MODE

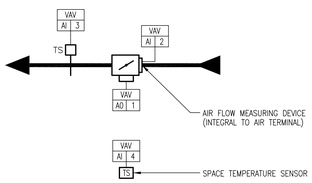
1. THE SUPPLY AIR TERMINAL UNIT AIR VOLUME REGULATOR SHALL CLOSE TO MINIMUM POSITION.
2. ON A DROP IN SPACE TEMPERATURE BELOW THE REDUCED UNOCCUPIED TEMPERATURE SET POINT OF 58° F, THE AIR VOLUME REGULATOR SHALL FULLY CLOSE.
3. ON A RISE IN TEMPERATURE ABOVE THE UNOCCUPIED SET POINT, THE REVERSE SHALL OCCUR.

D. WARM–UP MODE

1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL BE OPEN TO MINIMUM POSITION.

E. REFER TO AIR HANDLING UNIT SEQUENCE OF OPERATION FOR SYSTEM STATIC PRESSURE RESET REQUIREMENTS.

F. UPON LOSS OF POWER, AIR VOLUME REGULATOR SHALL FAIL TO THE LAST POSITION HELD PRIOR TO LOSS OF POWER.



VARIABLE VOLUME SUPPLY AIR TERMINAL UNIT WITHOUT REHEAT

TERMINAL UNIT SEQUENCE OF OPERATION

A. THE VARIABLE VOLUME AIR TERMINAL SHALL OPERATE ON AN OCCUPIED/UNOCCUPIED SCHEDULE. OCCUPIED/UNOCCUPIED MODES SHALL BE AS DETERMINED BY THE OCCUPIED/UNOCCUPIED PROGRAM OF THE BUILDING AUTOMATION SYSTEM (BAS).

B. OCCUPIED MODE

1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL MODULATE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SET POINT. ON A DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED SPACE TEMPERATURE SET POINT, THE AIR VOLUME REGULATOR SHALL MODULATE TOWARD IT'S MINIMUM POSITION SET POINT.
2. ON A FURTHER DROP IN SPACE TEMPERATURE BELOW THE OCCUPIED SET POINT WITH THE AIR VOLUME REGULATOR AT ITS MINIMUM SET POINT, THE REHEAT COIL VALVE SHALL MODULATE OPEN.
3. ON A RISE IN TEMPERATURE ABOVE THE OCCUPIED SET POINT, THE REVERSE SHALL OCCUR.

C. UNOCCUPIED MODE

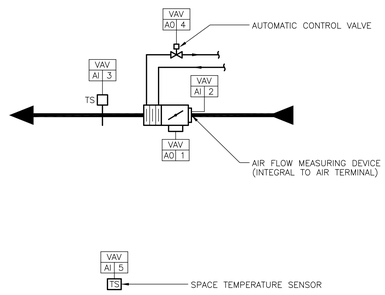
1. THE SUPPLY AIR TERMINAL UNIT AIR VOLUME REGULATOR SHALL CLOSE TO MINIMUM POSITION AND THE REHEAT VALVE SHALL BE FULLY CLOSED WHEN THE UNOCCUPIED MODE IS INITIATED.
2. ON A DROP IN SPACE TEMPERATURE BELOW THE REDUCED UNOCCUPIED TEMPERATURE SET POINT OF 58° F, THE REHEAT COIL VALVE SHALL MODULATE OPEN TO MAINTAIN THE UNOCCUPIED SET POINT.
3. ON A RISE IN TEMPERATURE ABOVE THE UNOCCUPIED SET POINT, THE REVERSE SHALL OCCUR.

D. WARM–UP MODE

1. THE SUPPLY AIR TERMINAL AIR VOLUME REGULATOR SHALL BE OPEN TO MINIMUM POSITION AND THE REHEAT VALVE SHALL BE MODULATED TO MAINTAIN THE OCCUPIED ROOM TEMPERATURE SET POINT.

F. REFER TO AIR HANDLING UNIT SEQUENCE OF OPERATION FOR SYSTEM STATIC PRESSURE RESET REQUIREMENTS.

G. UPON LOSS OF POWER, AIR VOLUME REGULATOR SHALL FAIL TO THE LAST POSITION HELD PRIOR TO LOSS OF POWER.



VARIABLE VOLUME SUPPLY AIR TERMINAL UNIT WITH REHEAT

SCALE: NONE

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — CRAIG R. BUCK

Jul 23 2013

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

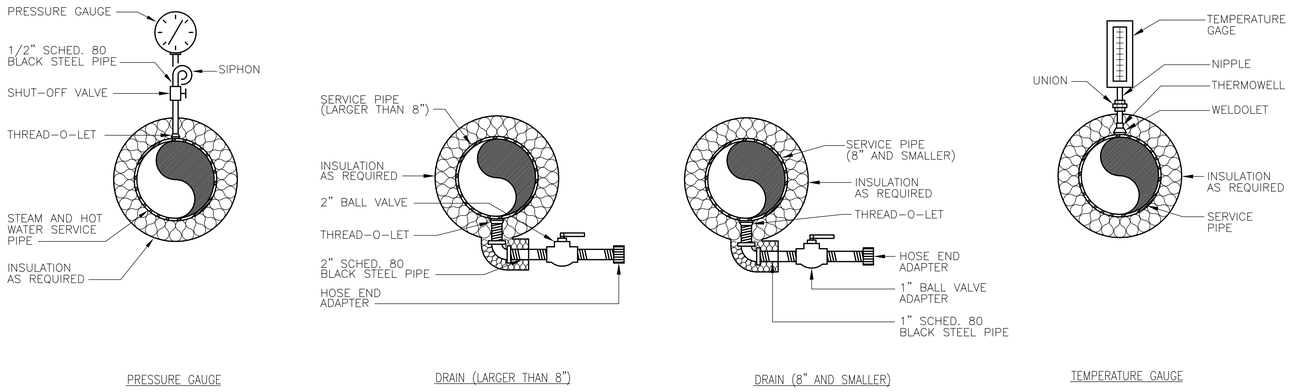
SCALE:	NONE	DATE:	7/22/13
DRAWN BY:	GTH	RMF JOB NO.:	312307.A0
DESIGNED BY:	BEK	CADD FILE:	
CHECKED BY:	CRB	OSE PROJECT #:	H27-6030-FW-B
PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

MECHANICAL SCHEMATICS

M3.01

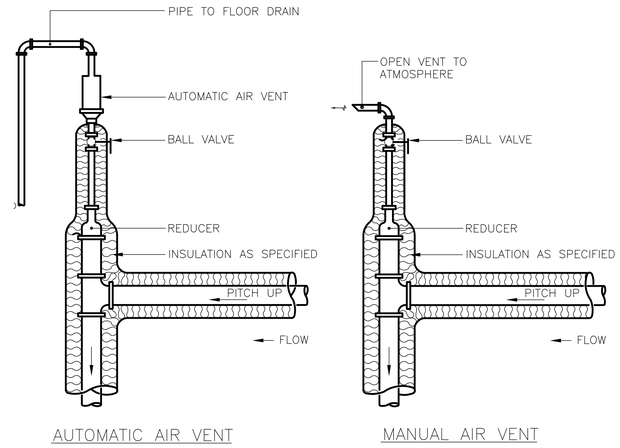


PRESSURE GAUGE | DRAIN (LARGER THAN 8") | DRAIN (8" AND SMALLER) | TEMPERATURE GAUGE

NOTE:
1. INSTALL DRAINS WHERE SHOWN ON DRAWINGS AND AT ALL LOW POINTS IN PIPING SYSTEMS.

DETAIL – TYPICAL PIPING ACCESSORIES INSTALLATION

SCALE: NONE (1)



AUTOMATIC AIR VENT | MANUAL AIR VENT

DETAIL – AIR VENT

SCALE: NONE (2)

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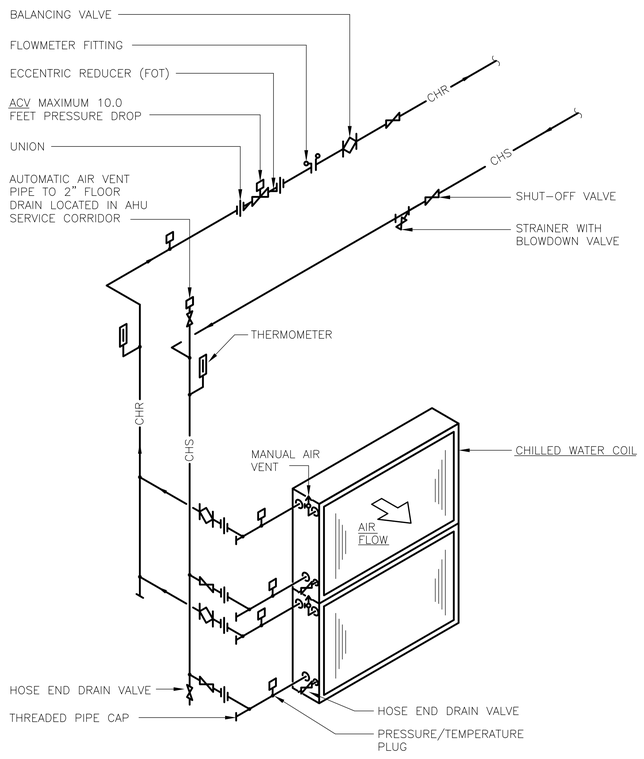
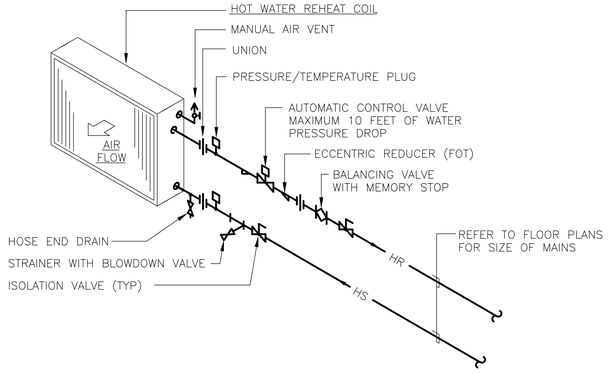


NOTES:
1. COIL SHALL BE PIPED COUNTERFLOW TO AIR FLOW.
2. REFER TO CHILLED WATER SCHEMATIC DIAGRAM FOR PIPE SIZES.
3. PIPING FOR SINGLE COOLING COIL SHALL BE SIMILAR.

DETAIL – COOLING COIL PIPING (2-WAY VALVE)

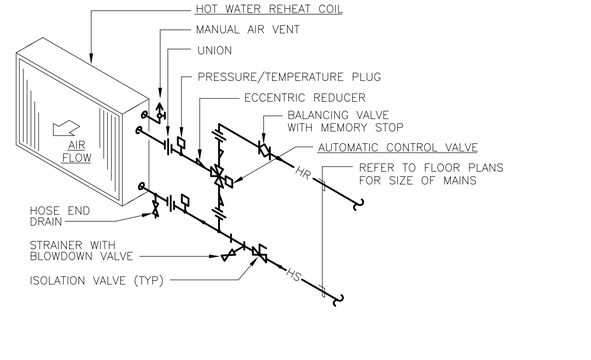
SCALE: NONE (3)



NOTES:
1. ALL TERMINAL UNIT REHEAT COILS SHALL BE PIPED IN A 2-WAY VALVE CONFIGURATION UNLESS OTHERWISE NOTED ON THE FLOOR PLANS OR AIR TERMINAL REHEAT UNIT SCHEDULE.

DETAIL – REHEAT COIL PIPING (2-WAY VALVE)

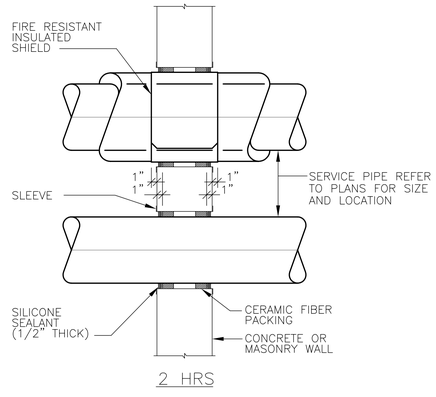
SCALE: NONE (4)



NOTES:
1. ALL TERMINAL UNIT REHEAT COILS SHALL BE PIPED IN A 2-WAY VALVE CONFIGURATION UNLESS OTHERWISE NOTED ON THE FLOOR PLANS OR AIR TERMINAL REHEAT UNIT SCHEDULE.

DETAIL – REHEAT COIL PIPING (3-WAY)

SCALE: NONE (5)

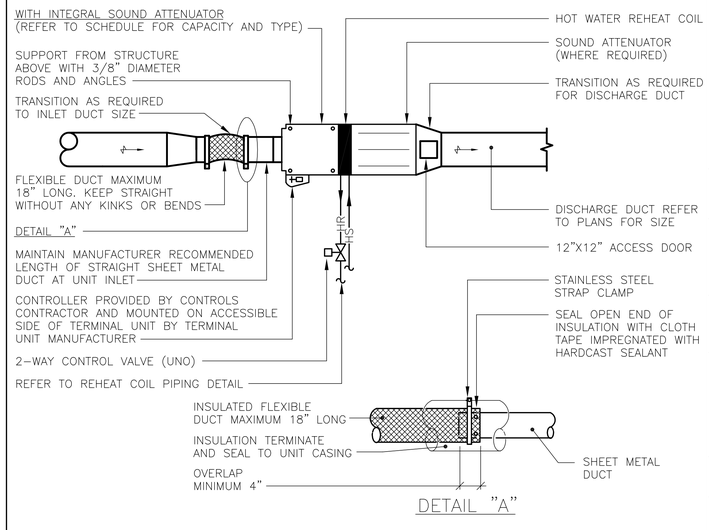


2 HRS

NOTES:
1. PROVIDE UL LISTED FIRE BARRIER SYSTEMS AND MATERIALS.

DETAIL – PIPE PENETRATION AT WALL – FIRE RESISTANT

SCALE: NONE (6)



DETAIL "A"

DETAIL – SUPPLY AIR TERMINAL REHEAT UNIT

SCALE: NONE (7)

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	NONE	DATE:	7/22/13
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GAMBRELL HALL REPAIRS (4TH FLOOR HVAC RENOVATIONS)

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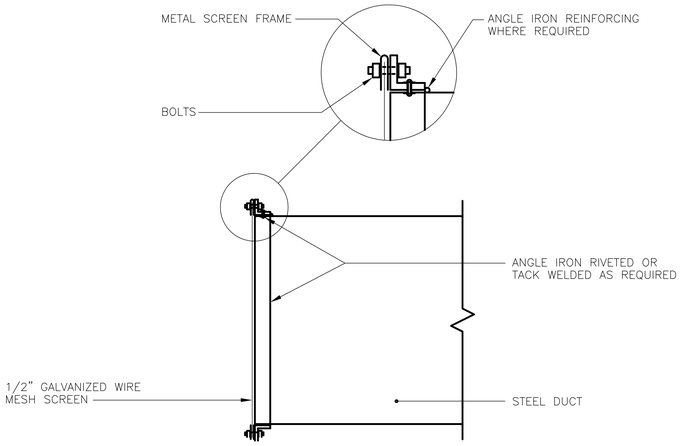
COLUMBIA, SC

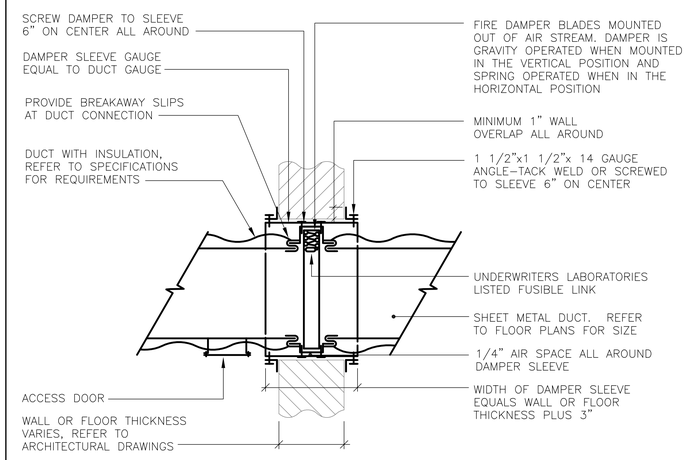
MECHANICAL DETAILS

M4.01



DETAIL – OPEN END DUCT WITH WIRE MESH SCREEN

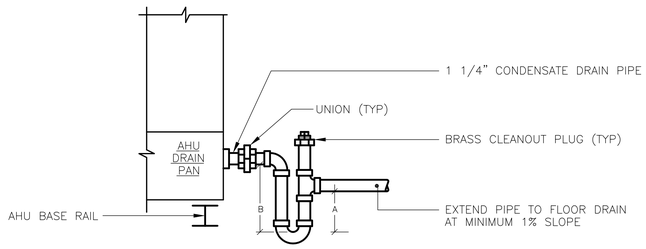
SCALE: NONE (1)



NOTES:
1. TERMINATION OF WALL OR FLOOR OPENING AT DAMPER SLEEVE SHALL BE AS REQUIRED BY UNDERWRITER'S LABORATORIES AND AS DEFINED UNDER ANOTHER DIVISION OF THE SPECIFICATIONS.
2. INSTALLATION SHALL BE PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

DETAIL – FIRE DAMPER INSTALLATION

SCALE: NONE (2)



NOTES:
1. FOR THE DRAW THRU COIL SECTION (NEGATIVE PRESSURE):
   P = STATIC PRESSURE AT DRAIN CONNECTION ("WG)
   A = (0.5 x P) + 1"
   B = (1.5 x P) + 2"

DETAIL – COIL CONDENSATE DEEP SEAL TRAP

SCALE: NONE (3)

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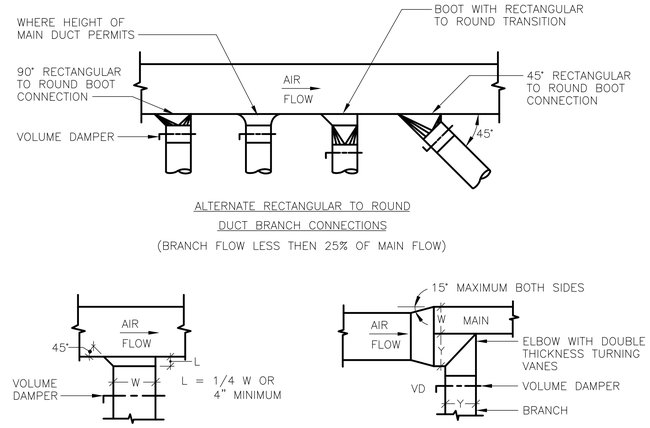


ALTERNATE RECTANGULAR TO ROUND DUCT BRANCH CONNECTIONS

(BRANCH FLOW LESS THEN 25% OF MAIN FLOW)

STANDARD RECTANGULAR DUCT BRANCH TAKE–OFF

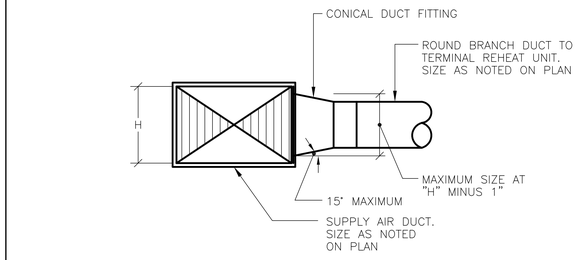
(BRANCH FLOW LESS THAN 25% OF MAIN FLOW)

STANDARD RECTANGULAR BRANCH TAKE–OFF

(BRANCH FLOW GREATER THAN 25% OF MAIN FLOW)

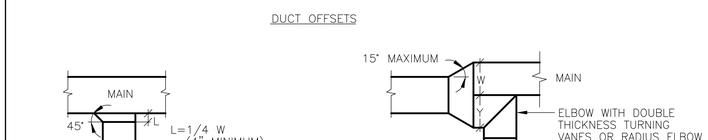
DETAIL – LOW VELOCITY BRANCH TAKE–OFF

SCALE: NONE (4)

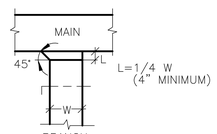


DETAIL – CONICAL DUCT TAP FITTING

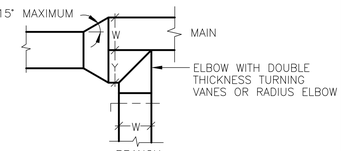
SCALE: NONE (5)



DUCT OFFSETS

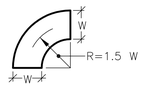


(BRANCH FLOW LESS THAN 25% OF MAIN FLOW)

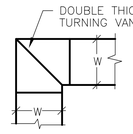


(BRANCH FLOW GREATER THAN 25% OF MAIN FLOW)

BRANCH TAKE–OFFS

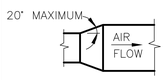


RADIUS ELBOW

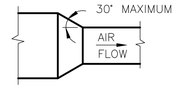


RECTANGULAR ELBOW

LOW VELOCITY ELBOWS



DIVERGING FLOW



CONVERGING FLOW

RECTANGULAR TO RECTANGULAR TRANSITIONS

DETAIL – RECTANGULAR DUCT FITTINGS

SCALE: NONE (8)

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	NONE	DATE:	7/22/13
DRAWN BY:	GTH	RMF JOB NO.:	312307.A0
DESIGNED BY:	BEK	CADD FILE:	
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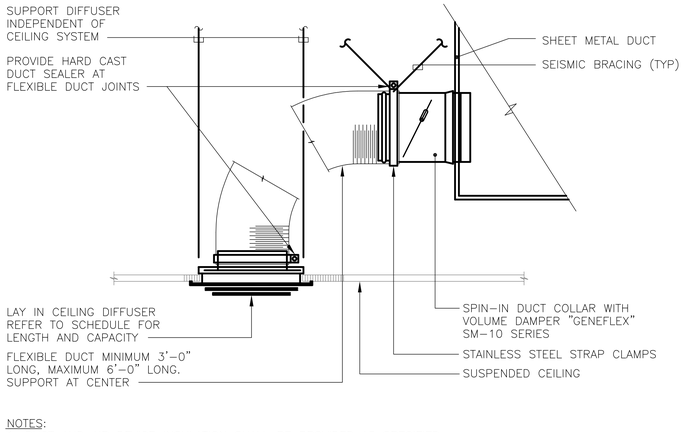
GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

MECHANICAL DETAILS

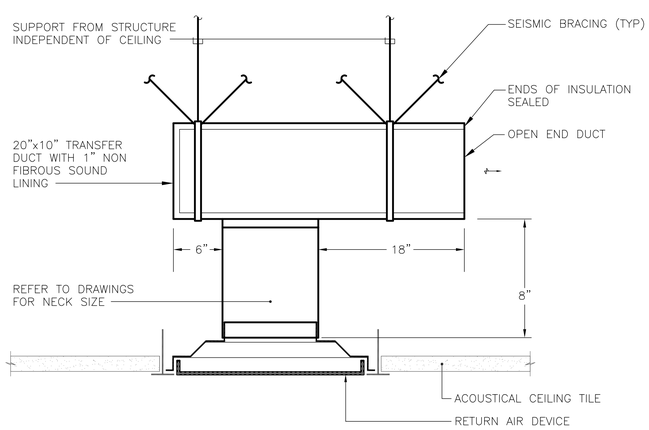
M4.02



NOTES:
1. DUCT AND AIR DEVICE INSULATION SHALL BE PROVIDED AS SPECIFIED.
2. PROVIDE ADDITIONAL ROUND, RIGID SHEET METAL DUCTWORK AS REQUIRED TO LIMIT FLEXIBLE DUCT LENGTH TO 6'–0" MAXIMUM.
3. MAXIMUM SAG 1/2" PER FOOT.
4. PROVIDE SEISMIC SWAY BRACING FOR ALL DUCTWORK AND HANGERS PER THE 2009 INTERNATIONAL BUILDING CODE AND 2009 INTERNATIONAL MECHANICAL CODE.
5. CONTRACTOR SHALL VERIFY MAXIMUM LOADING ON DUCTWORK SUPPORT ASSEMBLIES.

DETAIL – CEILING DIFFUSER BRANCH DUCTS

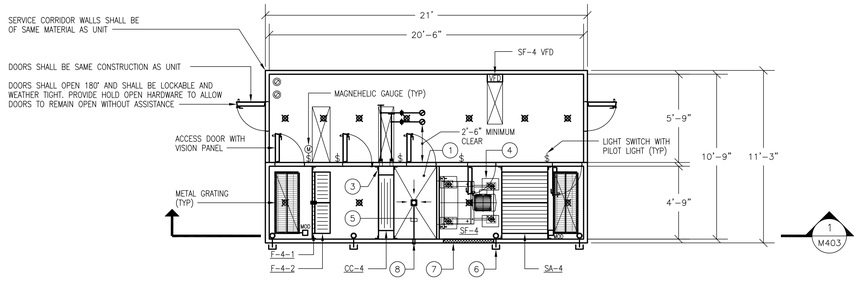
SCALE: NONE (6)



NOTES:
1. PROVIDE SEISMIC SWAY BRACING FOR ALL DUCTWORK AND HANGERS PER THE 2009 INTERNATIONAL BUILDING CODE AND 2009 INTERNATIONAL MECHANICAL CODE.
2. CONTRACTOR SHALL VERIFY MAXIMUM LOADING ON DUCTWORK SUPPORT ASSEMBLIES.

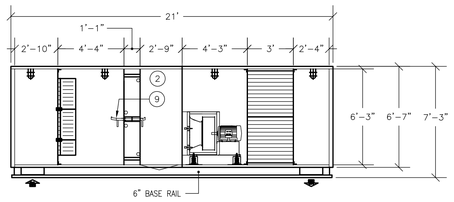
DETAIL – NON–DUCTED RETURN AIR REGISTER

SCALE: NONE (7)



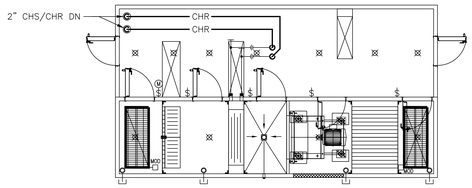
PLAN VIEW

SCALE: 1/4"=1'-0"



1 M403 SECTION

SCALE: 1/4"=1'-0"



PLAN VIEW – HVAC PIPING

SCALE: 1/4"=1'-0"

GENERAL NOTES

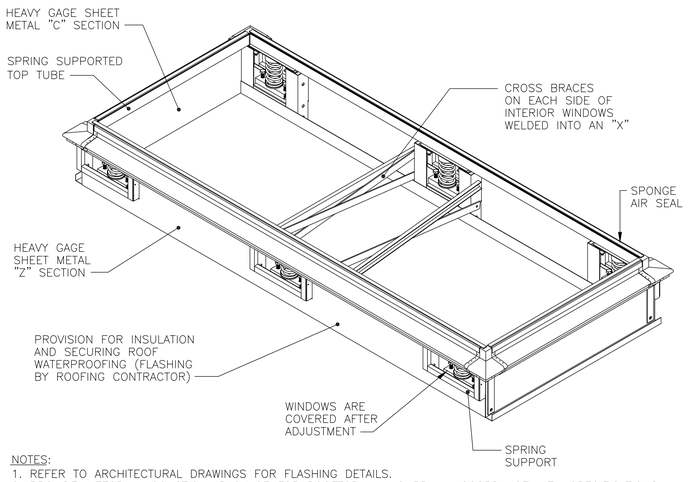
1. PROVIDE LIGHTING FIXTURES IN EACH AIR HANDLING UNIT COMPARTMENT AND SERVICE CORRIDOR. FIXTURES SHALL BE GASKETED OUTDOOR GRADE VAPOR PROOF FLUORESCENT WITH RAPID START LOW TEMPERATURE ELECTRONIC BALLASTS.
2. AUTOMATIC TEMPERATURE CONTROL END DEVICES SHALL BE FURNISHED UNDER DIVISION 23 SECTION "BUILDING AUTOMATION AND TEMPERATURE CONTROL SYSTEM" AND SHALL BE INSTALLED BY THE AIR HANDLING UNIT MANUFACTURER AT THE FACTORY.
3. AHU MANUFACTURER SHALL COORDINATE AND FACTORY PROVIDE ALL ELECTRICAL AND ATC PENETRATIONS TO MINIMIZE FIELD CUTTING OF UNIT CASING.

DRAWING NOTES

1. WELDED STAINLESS STEEL FLOOR SECTION SLOPED TO DRAIN.
2. STAINLESS STEEL CASING DOWNSTREAM OF COOLING COIL.
3. PROVIDE SAFING CAULKED AIRTIGHT AT EACH SECTION. SAFING MATERIAL SHALL BE GALVANIZED OR STAINLESS STEEL TO MATCH THE SPECIFICATIONS FOR INDIVIDUAL SECTIONS (TYP).
4. PROVIDE CONCRETE FOR INERTIA BASES AFTER AIR HANDLING UNITS ARE FULLY ASSEMBLED.
5. PIPING LOCATED BELOW FLOOR OF AIR HANDLING UNIT.
6. 2" MAINTENANCE DRAIN OPENING, PROVIDED WITH SEALED/GASKETED DRAIN PLUG TO PROHIBIT AIR OR WATER FROM ENTERING/LEAVING DURING UNIT OPERATION (TYP).
7. REMOVABLE PANEL SIZED TO ALLOW FOR FAN REMOVAL.
8. 2" CONDENSATE DRAIN WITH DEEP SEAL TRAP.
9. INTERMEDIATE DRAIN PAN.

AIR HANLDING UNIT AHU-4 DETAIL

SCALE: 1/4"=1'-0" (1)



NOTES:
1. REFER TO ARCHITECTURAL DRAWINGS FOR FLASHING DETAILS.
2. PROVIDE INTEGRAL ACOUSTICAL PACKAGE FOR ROOFTOP AHU CURB IN ACCORDANCE WITH SPECIFICATIONS.
3. INSTALL PER MANUFACTURERS INSTRUCTIONS.

DETAIL – SEISMIC SPRING ISOLATED ROOF CURB

SCALE: NONE (2)

–

SCALE: NONE (3)

–

SCALE: NONE (4)

–

SCALE: NONE (5)

–

SCALE: NONE (6)

–

SCALE: NONE (7)

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — CRAIG R. BUCK

Jul 23 2013

BIDDING DOCUMENTS

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REVISIONS

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PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
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University of South Carolina
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COLUMBIA, SC

MECHANICAL DETAILS

M4.03

FILTER SCHEDULE

DESIG	TYPE	NOMINAL CFM	APPROX BANK DIMENSION (IN) (WxHxD)	No CARTRIDGES	CARTRIDGE SIZE (IN) (WxHxD)	MAX FACE VELOCITY (FPM)	MEDIA AREA PER CARTRIDGE (FT^2)	MAXIMUM INITIAL PD AT 500 FPM (IN WG)	MERV RATING	BASIS OF DESIGN
F-4-1	A	10,000	–	4	24x24x2	450	17.3	0.31	8	CAMFIL FARR
				2	24x12x2		8.4	0.31		
F-4-2	B	10,000	–	4	24x24x12	450	58	0.41	13	CAMFIL FARR
				2	24x12x12		29	0.41		

AIR HANDLING UNIT SCHEDULE

DESIG	SERVICE	UNIT DATA			COOLING COIL DATA													ELECTRICAL			REMARKS
		CFM	OA (CFM)	WEIGHT (LBS)	DESIG	AIRFLOW (CFM)	EAT (°F) DB	EAT (°F) WB	LAT (°F) DB	LAT (°F) WB	TOTAL MBH	SENS MBH	GPM @ 46°F EWT 58°F LWT	MAXIMUM H_2O PD (FT H_2O)	MINIMUM FACE AREA (SF)	MAXIMUM FACE VEL (FPM)	No OF COILS	MAX FIN SPACING (FIN/INCH)	MAXIMUM AIR PD (IN H_2O)	MAX. NO. ROWS	(V/ø/Hz)	MCA	MOP	
AHU-4	4TH FLOOR	10,000	0	10,000	CC-4	10,000	80	67	51.3	51.2	237.1	159.5	39.4	13.8	11.08	450	2	9	0.92	8	480/3/60	–	–	①

① UNIT SHALL BE PROVIDED WITH SINGLE POINT POWER CONNECTION.

BUILDING DESIGN COMMISSIONING DATA

1. OUTSIDE DESIGN CONDITIONS (2009 ASHRAE 0.4%):

   SUMMER 96°Fdb/ 76°F wb
   WINTER 21°F

2. GENERAL BUILDING CRITERIA:

   WALL U-FACTOR : 0.068
   GLASS U-FACTOR : 0.27
   GLASS SHADING COEFFICIENT : 0.36

4. COMFORT HEATING :

   INTERIOR SPACES : 70°F ±2°F
   MECHANICAL/ELECTRIC ROOMS : 65°F ±5°F

5. COMFORT COOLING & DEHUMIDIFICATION :

   INTERIOR SPACES : 72°F ±2°F/50% RH ±10%

6. DESIGN SUPPLY AIR TEMPERATURE (TO SPACE) : 55°F

7. DESIGN FAN HEAT GAIN (DRAW THRU) : 2.5°F (AT MAX FILTER LOADING)

9. CODES AND STANDARDS:

   2009 INTERNATIONAL BUILDING CODE
   2009 INTERNATIONAL MECHANICAL CODE
   2009 INTERNATIONAL PLUMBING CODE
   2009 INTERNATIONAL ENERGY CONSERVATION CODE
   2009 INTERNATIONAL FIRE CODE
   NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS (LATEST EDITIONS)
   ASHRAE STANDARDS AND HANDBOOKS (LATEST EDITIONS)
   OWNER'S INSURANCE UNDERWRITER STANDARDS

FAN SCHEDULE

DESIG	SERVICE	TYPE	CFM	TSP (INCH WG)	APPROXIMATE FAN RPM	BHP	MOTOR HP	WHEEL DIAMETER (INCH)	DRIVE	AMCA CONSTRUCTION CLASS	ELECTRICAL (V/ø/HZ)	APPROXIMATE WEIGHT (LBS)	BASIS OF DESIGN	REMARKS
SF-4	AHU-4	PLENUM	10,000	6	1857	13.08	15	–	DIRECT	II	480/3/60	–	–	

① –
② –

AIR DEVICE SCHEDULE

No.	DUTY	TYPE	CFM RANGE LOW	CFM RANGE HIGH	FACE/MODULE SIZE (IN)	NOMINAL DUCT SIZE (IN)	BLOW	MAX TOTAL AIR PD (IN H_2O)	MAX NOISE CRITERIA VALUE	BASIS OF DESIGN	REMARKS
A1	CEILING SUPPLY DIFFUSER	A	0	150	24x24	6ø	4-WAY	0.15	25	TITUS/PAS	①④
A2	CEILING SUPPLY DIFFUSER	A	151	250	24x24	8ø	4-WAY	0.15	25	TITUS/PAS	②④
A3	CEILING SUPPLY DIFFUSER	A	251	350	24x24	10ø	4-WAY	0.15	25	TITUS/PAS	②④
A4	CEILING SUPPLY DIFFUSER	A	351	500	24x24	12ø	4-WAY	0.15	25	TITUS/PAS	③④
A5	CEILING SUPPLY DIFFUSER	A	501	700	24x24	14ø	4-WAY	0.15	25	TITUS/PAS	③④
A6	CEILING SUPPLY DIFFUSER	A	151	250	24x24	10ø	3-WAY	0.15	20	TITUS/PAS	③④
C1	RETURN REGISTER	B	0	800	24x24	18x18	0° DEFL	0.10	20	TITUS/PAR	④

① 9"x9" BACKPAN SIZE
② 12"x12" BACKPAN SIZE
③ 18"x18" BACKPAN SIZE
④ SCHEDULED MODULE SIZE IS NOMINAL, AND WHERE REQUIRED SHALL FIT WITHIN 24"x24" ARCHITECTURAL ACOUSTICAL CEILING GRID.

SUPPLY AIR TERMINAL REHEAT UNIT SCHEDULE

DESIG (No.)	CFM MAXIMUM	CFM MINIMUM	INLET SIZE (INCHES)	OUTLET SIZE (INCHES)	MAXIMUM INLET SP (INCH WG) ①	MAXIMUM NC VALUE @1.5 INCH WG INLET SP ①	HEATING COIL PERFORMANCE EAT (°F)	LAT (°F)	MBH @180°F EWT	MAXIMUM WATER PD (FT WG)	ROWS	GPM @20°F ΔT	BASIS OF DESIGN	REMARKS
401	430	215	8	12x10	0.3	25	55	90	8.1	5.0	2	0.8	TITUS DESV	①
402	440	220	8	12x10	0.3	25	55	90	8.3	5.0	2	0.8	TITUS DESV	①
403	250	125	6	12x8	0.3	25	55	95	5.4	5.0	2	0.5	TITUS DESV	①
404	270	135	6	12x8	0.3	25	55	90	5.1	5.0	2	0.5	TITUS DESV	①
405	360	180	8	12x10	0.3	25	55	90	6.8	5.0	2	0.7	TITUS DESV	①
406	360	180	8	12x10	0.3	25	55	90	6.8	5.0	2	0.7	TITUS DESV	①
407	285	145	6	12x8	0.3	25	55	90	5.5	5.0	2	0.5	TITUS DESV	①
408	180	100	6	12x8	0.3	25	55	95	4.3	5.0	2	0.4	TITUS DESV	①
409	275	140	6	12x8	0.3	25	55	95	6.0	5.0	2	0.6	TITUS DESV	①
410	275	160	6	12x8	0.3	25	55	95	6.9	5.0	2	0.7	TITUS DESV	①
411	625	315	10	14x12	0.3	25	55	84	9.8	5.0	2	1.0	TITUS DESV	①
412	220	110	6	12x8	0.3	25	55	84	3.4	5.0	2	0.3	TITUS DESV	①
413	350	175	8	12x8	0.3	25	55	80	4.7	5.0	2	0.5	TITUS DESV	①
414	610	305	10	14x12	0.3	25	55	90	11.5	5.0	2	1.2	TITUS DESV	①
415	620	310	10	14x12	0.3	25	55	84	9.7	5.0	2	1.0	TITUS DESV	①
416	275	140	6	12x8	0.3	25	55	80	3.8	5.0	2	0.4	TITUS DESV	①
417	545	275	8	12x10	0.3	25	55	80	7.4	5.0	2	0.7	TITUS DESV	①
418	400	400	8	12x10	0.3	25	55	95	17.5	5.0	2	1.7	TITUS DESV	①
419	720	360	10	14x12	0.3	25	55	80	9.7	5.0	2	1.0	TITUS DESV	①
420	1500	1500	14	20x18	0.3	25	55	95	64.8	5.0	2	6.5	TITUS DESV	①
420	240	240	6	12x8	0.3	25	55	–	–	–	–	–	TITUS DESV	②
421	125	125	4	12x8	0.3	25	55	95	5.4	5.0	2	0.5	TITUS DESV	①

① THE MAXIMUM INLET SP AND SOUND CRITERIA VALUES SCHEDULED INCLUDE PRESSURE LOSSES AND ACOUSTICAL ADJUSTMENTS ASSOCIATED WITH THE INTEGRAL SOUND ATTENUATOR.
② COOLING ONLY.

DUCT CONSTRUCTION / TEST SCHEDULE

DUCT SYSTEM	MAXIMUM OPERATING PRESSURE (IN WG)	DUCT CONSTRUCTION CONSTRUCTION CLASS (IN WG)	DUCT CONSTRUCTION POSITIVE OR NEGATIVE	DUCT CONSTRUCTION SMACNA DUCT SEALING REQUIREMENTS	DUCT PRESSURE TEST TEST REQUIRED (YES/NO)	DUCT PRESSURE TEST TEST PRESSURE (IN WG)	DUCT PRESSURE TEST ALLOWABLE LEAKAGE RATE (%)	REMARKS
SUPPLY DUCT UPSTREAM OF TERMINAL UNITS	6	6	POSITIVE	A	YES	6	2	①②
SUPPLY DUCT DOWNSTREAM OF TERMINAL UNITS	2	2	POSITIVE	B	NO	2	3	③
RETURN DUCT	-2	2	NEGATIVE	B	NO	2	3	③
EXHAUST DUCTWORK	-2	2	NEGATIVE	B	NO	2	3	

① TEST PER SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL, 1ST EDITION.
② UPSTREAM OF TERMINAL UNIT (FROM AIR HANDLING UNIT TO TERMINAL UNIT).
③ DOWNSTREAM OF TERMINAL UNIT (FROM TERMINAL UNIT TO AIR DEVICE).

SOUND ATTENUATOR SCHEDULE

SERVICE	DESIG.	SIZE WxHxL (INCHES)	MAXIMUM CAPACITY (CFM)	MAXIMUM AIR PD (IN H_2O)	MAX FACE VELOCITY (FPM)	INSERTION LOSS (dB) OCTAVE BAND 2	3	4	5	6	7	8	REMARKS	BASIS OF DESIGN
SUPPLY AIR TERMINAL UNITS W/ 4" INLET	–	12x8x36	100	0.10	500	–	–	–	–	–	–	–	①②③	
SUPPLY AIR TERMINAL UNITS W/ 5" INLET	–	12x8x36	200	0.10	500	–	–	–	–	–	–	–	①②③	
SUPPLY AIR TERMINAL UNITS W/ 6" INLET	–	12x8x36	300	0.10	500	–	–	–	–	–	–	–	①②③	
SUPPLY AIR TERMINAL UNITS W/ 7" INLET	–	12x10x36	415	0.10	500	–	–	–	–	–	–	–	①②③	
SUPPLY AIR TERMINAL UNITS W/ 8" INLET	–	12x10x36	500	0.10	500	–	–	–	–	–	–	–	①②③	
SUPPLY AIR TERMINAL UNITS W/ 9" INLET	–	14x12x36	600	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR TERMINAL UNITS W/ 10" INLET	–	16x12x36	700	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR TERMINAL UNITS W/ 12" INLET	–	18x16x36	1,000	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR TERMINAL UNITS W/ 14" INLET	–	22x18x36	1,350	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR TERMINAL UNITS W/ 16" INLET	–	24x18x36	1,500	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR TERMINAL UNITS W/ 24"x16" INLET	–	38x18x36	2,000	0.10	500	9	12	12	17	23	18	11	①②	VIBRO-ACOUSTICS
SUPPLY AIR AHU-4	SA-4	36x24x36	10,000	0.10	500	9	12	12	17	23	18	11		VIBRO-ACOUSTICS

① REFER TO FLOOR PLANS FOR QUANTITY OF SUPPLY AIR TERMINAL UNITS.
② PROVIDE ALL NECESSARY DUCTWORK TRANSITIONS REQUIRED FOR CONNECTION TO SUPPLY TERMINAL UNIT SOUND ATTENUATORS.
③ TERMINAL UNIT MANUFACTURER SHALL PROVIDE INTEGRAL SOUND ATTENUATOR.
④ PROVIDE ALL NECESSARY DUCTWORK TRANSITIONS REQUIRED FOR CONNECTION TO SOUND ATTENUATORS.

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — BRENG R. BLOCK

Jul 23 2013

BIDDING DOCUMENTS

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REVISIONS

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GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

MECHANICAL SCHEDULES

M5.01

THROUGH PENETRATION FIRESTOP SCHEDULE

A. THIS SCHEDULE IDENTIFIES REQUIREMENTS FOR ACCEPTABLE THROUGH PENETRATION FIRESTOPS BASED ON BARRIER TYPE, BASIS OF BARRIER CONSTRUCTION, AND PENETRANT TYPE. THIS IS A STANDARD THROUGH PENETRATION FIRESTOP SCHEDULE. SOME BARRIERS AND/OR PENETRANT TYPES MAY NOT APPEAR ON THE DRAWINGS.
B. THROUGH PENETRATION FIRESTOPS ARE NOT REQUIRED FOR FLOOR PENETRATIONS CONTAINED TOTALLY WITHIN A RATED SHAFT ENCLOSURE.
C. FOR EACH PENETRATION, SELECT A THROUGH PENETRATION FIRESTOP BASED ON ACTUAL FIELD CONDITIONS, WHICH INCLUDE BUT ARE NOT LIMITED TO PENETRATION SIZE, PENETRATION SHAPE, PENETRANT MATERIAL(S), QUANTITY OF PENETRANTS PER PENETRATION, AND LOCATION(S) OF PENETRANT(S) WITHIN PENETRATION.
D. NOMENCLATURE OF UL CLASSIFIED FIRESTOP ASSEMBLIES USED IN THIS SCHEDULE IS IDENTICAL TO THAT USED IN CATALOGS OF APPROVED FIRESTOP MANUFACTURERS (SEE DIVISION 23) AND IN UNDERWRITERS LABORATORIES "FIRE RESISTANCE DIRECTORY."

RATED BARRIER		FIRESTOP ASSEMBLY REQUIREMENTS		PENETRANT TYPE						
TYPE	BASIS OF CONSTRUCTION			NO PENETRANTS	METALLIC, UNINSULATED PIPE OR TUBING (EX. COPPER, IRON, STEEL) (NOTE 14)	NONMETALLIC, UNINSULATED PIPE OR TUBING (EX. PVC, PP, CPVC, GLASS, FRPP)	INSULATED PIPES (EX. COPPER, IRON PLASTIC, STEEL) IN SYSTEMS OPERATING BETWEEN 32°F AND 122°F (NOTE 1)	INSULATED PIPES (EX. COPPER, IRON PLASTIC, STEEL) IN SYSTEMS OPERATING BELOW 32°F OR ABOVE 122°F (NOTE 2)	METAL DUCT (NOTE 3)	RECESSED DEVICES (NOTE 4)
WALL	WOOD STUDS & GYPSUM WALLBOARD (U300 SERIES)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-L-0000 SERIES OR NOTE 5	W-L-1000 SERIES	W-L-2000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-7000 SERIES	W-L-7000 SERIES NOTE 8
			MULTIPLE PENETRANTS		W-L-8000 SERIES (NOTE 6)		W-L-8000 SERIES (NOTE 6)	W-L-8000 SERIES (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 13	NOTE 13	NONE	NOTE 7	NONE	NONE
WALL	METAL STUDS & GYPSUM WALLBOARD (U400 SERIES)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-L-0000 SERIES OR NOTE 5	W-L-1000 SERIES	W-L-2000 SERIES	W-L-5000 SERIES	W-L-5000 SERIES	W-L-7000 SERIES	W-L-7000 SERIES NOTE 8
			MULTIPLE PENETRANTS		W-L-8000 SERIES (NOTE 6)		W-L-8000 SERIES (NOTE 6)	W-L-8000 SERIES (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 13	NOTE 13	NONE	NOTE 7	NONE	NONE
WALL	POURED CONCRETE, CONCRETE BLOCK OR MASONRY (BLOCK & U900 SERIES) (ANY THICKNESS)	UL CLASSIFIED SERIES	SINGLE PENETRANT	W-J-0000 SERIES OR NOTE 5	C-AJ-1000 OR W-J-1000 SERIES	C-AJ-2000 OR W-J-2000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-5000 OR W-J-5000 SERIES	C-AJ-7000 OR W-J-7000 SERIES	NOTE 8
			MULTIPLE PENETRANTS		C-AJ-8000 OR W-J-8000 SERIES (NOTE 6)		C-AJ-8000 OR W-J-8000 (NOTE 6)	C-AJ-8000 OR W-J-8000 (NOTE 6)	N/A	
		F RATING		EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING	EQUAL TO WALL RATING
		T RATING		NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10	NOTE 10
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTES 12 & 13	NOTE 13	NONE	NOTE 7	NONE	NONE
FLOOR	POURED CONCRETE (ANY THICKNESS)	UL CLASSIFIED SERIES	SINGLE PENETRANT	C-AJ-0000 SERIES F-A-0000 SERIES OR NOTE 5	C-AJ-1000 OR F-A-1000 SERIES	C-AJ-2000 OR F-A-2000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-5000 OR F-A-5000 SERIES	C-AJ-7000 OR F-A-7000 SERIES	NOTE 8
			MULTIPLE PENETRANTS		C-AJ-8000 OR F-A-8000 SERIES (NOTE 6)		C-AJ-8000 OR F-A-8000 (NOTE 6)	C-AJ-8000 OR F-A-8000 (NOTE 6)	N/A	
		F RATING		EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR	EQUAL TO FLOOR RATING, BUT NOT LESS THAN 1 HR
		T RATING		NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11	NOTE 11
		EXCEPTIONS/ ADDED REQUIREMENTS		NONE	NOTE 12	NONE	NONE	NOTE 7	NONE	NONE

NOTES

1. EXAMPLES OF SYSTEMS THAT OPERATE BETWEEN 32 DEGF AND 122 DEGF:

   CHILLED WATER SUPPLY & RETURN
   HEAT PUMP WATER SUPPLY & RETURN
   DOMESTIC COLD AND TEMPERED WATER
   DOMESTIC HOT WATER LESS THAN 122 DEGF
   DOMESTIC HOT WATER RECIRCULATION LESS THAN 122 DEGF

2. EXAMPLES OF SYSTEMS OPERATING BELOW 32 DEGF OR ABOVE 122 DEGF:

   STEAM SUPPLY & RETURN
   STEAM VENT
   CONDENSATE PUMP DISCHARGE
   BOILER BLOWDOWN
   CRYOGENIC VENT
   ENGINE GENERATOR EXHAUST
   HEATING HOT WATER SUPPLY & RETURN
   HOT-CHILLED WATER SUPPLY & RETURN
   GLYCOL HEATING HOT WATER SUPPLY & RETURN
   DOMESTIC HOT WATER SUPPLY 140 DEGF
   DOMESTIC HOT WATER RECIRCULATION 140 DEGF

3. THIS SCHEDULE'S DATA APPLY ONLY TO PENETRATIONS WITHOUT DAMPERS. FOR DAMPERED PENETRATIONS, REFER TO SPECIFICATIONS. AT DAMPERS, DO NOT APPLY MATERIAL THAT IS NOT INCLUDED IN THE DAMPER'S CLASSIFICATION.

4. EXAMPLES OF RECESSED DEVICES:

   MEDICAL GAS ZONE VALVES
   MEDICAL GAS OUTLETS
   FIRE VALVE CABINETS
   FIRE HOSE CABINETS
   UNIT HEATERS
   FIRE FIGHTERS' PHONE
   FIRE EXTINGUISHER CABINET
   CENTRAL VACUUM OUTLETS

5. SEAL OPENING USING BARRIER'S ORIGINAL CONSTRUCTION.

6. WHERE A SERIES 8000 CLASSIFIED SYSTEM IS NOT AVAILABLE, INSTALL PENETRANTS SINGLY, AND PROVIDE SINGLE-PENETRANT SYSTEMS.

7. FOR SYSTEMS THAT OPERATE BELOW 32°F OR ABOVE 122°F, COMPLY WITH THE FOLLOWING ADDITIONAL REQUIREMENTS:

   A. PROVIDE TPFS SYSTEM USING INTUMESCENT ELASTOMERIC WRAP STRIP AS ITS FILL, VOID, OR CAVITY MATERIAL.
   B. DO NOT USE SERIES 8000 PENETRATIONS. PROVIDE ONLY SINGLE PENETRATIONS.

8. WHERE UL CLASSIFIED SYSTEMS ARE NOT AVAILABLE FOR OTHER RECESSED DEVICES, MAINTAIN CONTINUITY OF RATED BARRIER CONSTRUCTION AROUND RECESS.

9. REQUIREMENTS FOR MEMBRANE PENETRATIONS AND THROUGH PENETRATIONS ARE IDENTICAL.

10. TEMPERATURE (T) RATINGS OF ASSEMBLIES IN WALLS MAY EQUAL ZERO.

11. TEMPERATURE (T) RATINGS OF ASSEMBLIES IN FLOORS SHALL EQUAL THE GREATER OF EITHER THE BARRIER RATING OR ONE HOUR EXCEPT AS FOLLOWS:

    A. AN ASSEMBLY'S T RATING MAY EQUAL ZERO WHEN THE PENETRANT ABOVE THE FLOOR PENETRATION IS CONTAINED AND LOCATED WITHIN THE CAVITY OF A WALL.

12. CLASSIFIED TPFS ASSEMBLY IS NOT REQUIRED WHEN ALL THE FOLLOWING CONDITIONS ARE MET:

    A. PENETRANT HAS A MAXIMUM NOMINAL DIAMETER OF 6-INCHES.
    B. PENETRATION HAS A MAXIMUM AREA OF 144 SQUARE INCHES.
    C. ANNULAR SPACE IS COMPLETELY FILLED WITH CONCRETE, GROUT, OR MORTAR THE FULL THICKNESS OF THE BARRIER.

13. OPENINGS ACCOMMODATING NONCOMBUSTIBLE CONDUITS, PIPES AND TUBES THROUGH SINGLE MEMBRANES WHICH ARE PART OF A FIRE RESISTANCE RATED WALL ASSEMBLY ARE PERMITTED WHEN:

    A. AGGREGATE AREA OF THE MEMBRANE OPENINGS DO NOT EXCEED 100 SQUARE INCHES FOR ANY 100 SQUARE FEET OF WALL AREA.

14. THIS COLUMN ALSO INCLUDES WIRES AND CABLES WITH STEEL JACKETS.

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — PROFESSIONAL ENGINEER — No. 24044 — CRAIG R. BLOCK

Jul 23 2013

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	NONE	DATE:	7/22/13
DRAWN BY:	GTH	RMF JOB NO.:	312307.A0
DESIGNED BY:	BEK	CADD FILE:	
CHECKED BY:	CRB	OSE PROJECT #:	H27-6030-FW-B
PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

MECHANICAL SCHEDULES

M5.02

ELECTRICAL DIAGRAMS

SYMBOL	DESCRIPTIONS
	AUTOMATIC TRANSFER DEVICE
A	METERING DEVICES: A–AMMETER, V–VOLTMETER, PF–POWER FACTOR, HZ–FREQUENCY METER
DM	DIGITAL METER
(50)	FUSE, FUSE SIZE AS INDICATED (50A)
	GROUND CONNECTION
	TRANSFORMER (DELTA – RESISTANCE GROUNDED WYE SHOWN)
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	LIGHTNING ARRESTOR
	MOTOR STARTER CONTACTOR AND THERMAL OVERLOAD
KI	KIRK KEY INTERLOCK SYSTEM
TRIP FRAME	MOLDED CASE CIRCUIT BREAKER WITH RATINGS AS INDICATED
	SWITCH
	DRAW OUT DEVICE
DO	DRAW OUT POWER CIRCUIT BREAKER
TMB	TEST TERMINAL BLOCK
TB	WIRING TERMINAL BLOCK
	INDICATOR OR PILOT LIGHT: R–RED, B–BLUE, W–WHITE, G–GREEN, A–AMBER
CB	ENCLOSED CIRCUIT BREAKER
FVNR	COMBINATION MAGNETIC MOTOR STARTER. ABBREVIATION INDICATES TYPE: FVNR, FVR, RVAT, 2S1W, 2S2W, SST
VFC	VARIABLE FREQUENCY CONTROLLER W/FUSED DISCONNECT SWITCH
VFC	VARIABLE FREQUENCY CONTROLLER

ELECTRICAL DRAWING PRESENTATION

SYMBOL	DESCRIPTIONS
2	REVISION NUMBER 2
2	DRAWING NOTE NUMBER 2
22A	EQUIPMENT TAG NUMBER – REFER TO EQUIPMENT SCHEDULE
X / XX / XX	SECTION/ELEVATION IDENTIFICATION
X / XX	PART PLAN AND DETAIL IDENTIFICATION
	EXISTING LINE TYPE
	NEW ELECTRICAL WORK LINE TYPE
	FUTURE ELECTRICAL WORK LINE TYPE
	DEMOLITION LINE TYPE ON DEMOLITION DRAWINGS

EQUIPMENT DESIGNATIONS

DESIGNATION	DESCRIPTIONS
SWGR	SWITCHGEAR
SWBD	SWITCHBOARD
PNL	PANELBOARD
MCC	MOTOR CONTROL CENTER
XFMR	TRANSFORMER

CIRCUIT DESIGNATIONS

LIGHTING — A # o

- FIXTURE TYPE
- *CIRCUIT DESIGNATION
- SWITCH DESIGNATION

POWER — #

- *CIRCUIT DESIGNATION

* SEE NOTES FOR PANEL DESIGNATIONS FOR EACH AREA.

POWER SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
Φ	COMBINATION SWITCH AND SIMPLEX RECEPTACLE	48" TOD
Φ	COMBINATION SWITCH AND DUPLEX RECEPTACLE	48" TOD
	SIMPLEX RECEPTACLE	18" CTR
E	DUPLEX RECEPTACLE, 'E' (IF SHOWN) INDICATES CONNECTED TO EMERGENCY CIRCUIT.	18" CTR
	DUPLEX RECEPTACLE, FLOOR MOUNTED	
	DUPLEX RECEPTACLE, SPLIT WIRED – TOP HALF SWITCHED	18" CTR
	DUPLEX RECEPTACLE, CEILING MOUNTED	
	PEDESTAL TYPE DUPLEX RECEPTACLE	
A	SPECIAL RECEPTACLE: 20A, 2P, 3W, 208V NEMA 6–20R	18" CTR
B	SPECIAL RECEPTACLE: 30A, 2P, 3W, 208V NEMA 6–30R	18" CTR
C	SPECIAL RECEPTACLE: 20A, 3P, 4W, 208/120V NEMA 14–20	18" CTR
D	SPECIAL RECEPTACLE: 30A, 3P, 4W, 208V NEMA 15–30	18" CTR
A	SPECIAL RECEPTACLE, FLOOR MOUNTED, NEMA 6–20R	
A	PEDESTAL TYPE SPECIAL RECEPTACLE, NEMA 6–20R	
	DOUBLE DUPLEX RECEPTACLE	18" CTR
	RECEPTACLE MOUNTED 6" ABOVE BACK SPLASH OR COUNTER	
GFI	GROUND FAULT INTERRUPTER TYPE RECEPTACLE	18" BOD
	JUNCTION BOX	
	EQUIPMENT CONNECTION AS NOTED	
3	HEATER CONNECTION – NUMBER INDICATES KILOWATTS (3KW)	
	HEATER FAN – CEILING MOUNTED	
CB	ENCLOSED CIRCUIT BREAKER	
	NON–FUSED DISCONNECT SWITCH, 30A, 3P (UNLESS OTHERWISE NOTED)	
40A	FUSED DISCONNECT SWITCH – FUSE SIZE AS INDICATED (40A)	
MS	MAGNETIC MOTOR STARTER	
MN	COMBINATION MAGNETIC MOTOR STARTER. ABBREVIATION INDICATES TYPE: FVNR, FVR, RVAT, 2S1W, 2S2W, SST	
VFC	VARIABLE FREQUENCY CONTROLLER W/FUSED DISCONNECT SWITCH	
	MOTOR – NUMERALS (IF SHOWN) INDICATE HP	
	GENERATOR – NUMERALS (IF SHOWN) INDICATE KW	
W	MANUAL MOTOR STARTER WITH THERMAL OVERLOADS	
CP	CONTROL PANEL – TYPE AS INDICATED	
PB	MOMENTARY CONTACT START–STOP PUSH BUTTON STATION	
PBM	MAINTAINED CONTACT START–STOP PUSHBUTTON STATION	
ES	MAINTAINED CONTACT EMERGENCY STOP PUSHBUTTON STATION	
	PANELBOARD	
	DISTRIBUTION PANELBOARD	
T	TRANSFORMER	
	RACEWAY "UP" OR "TOWARDS"	
	RACEWAY "DOWN" OR "AWAY"	
	CIRCUIT CONCEALED IN WALLS OR CEILING SPACE. CONDUCTORS SHALL BE MINIMUM 2#12 AWG AND 1#12 AWG GROUND IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	RACEWAY CONCEALED IN SLAB OR BELOW GRADE.	
	BRANCH CIRCUIT HOMERUN TO PANELBOARD. QUANTITY OF CIRCUITS INDICATED BY ARROWS ( ). NUMBER OF CONDUCTORS SHALL BE MINIMUM 4#12 AWG AND 1#12 AWG GROUND IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	RACEWAY RUN EXPOSED. CONDUCTORS SHALL BE MINIMUM 2#12 AWG AND 1#12 AWG IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	BUS DUCT OR CABLE TRAY UP OR TOWARDS	
	BUS DUCT OR CABLE TRAY DOWN OR AWAY	
	BUS DUCT, TYPE & SIZE AS INDICATED	
	TELEPHONE AND POWER POLE ASSEMBLY	
	CONCRETE ENCASED DUCTBANK BELOW GRADE	
W	SURFACE MOUNTED RACEWAY ASSEMBLY WITH REMOVABLE COVER	
	MULTI OUTLET ASSEMBLY – DARK SQUARES INDICATE PREWIRED RECEPTACLE LOCATIONS. SIZE AS INDICATED.	
	MULTI–OUTLET ASSEMBLY WITH RECEPTACLES LOCATED WHERE INDICATED	
	2 CELL MULTI–OUTLET ASSEMBLY WITH COMMUNICATION DEVICES AND RECEPTACLES LOCATED WHERE INDICATED	
	MULTI–OUTLET ASSEMBLY WITH COMMUNICATION OUTLETS LOCATED WHERE INDICATED	
	FLEXIBLE CONDUIT	
	CABLE TRAY	
	GROUND ROD	
X	LIGHTNING PROTECTION AIR TERMINAL	
	GROUND WIRE CONNECTION	
	GROUND WIRE	
	LIGHTNING PROTECTION DOWN LEAD	
	UTILITY POLE	

LIGHTING SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
$	SINGLE POLE TOGGLE SWITCH	48" TOD
$B	SWITCH – SUBLETTER INDICATES FIXTURES CONTROLLED	48" TOD
$2	DOUBLE POLE TOGGLE SWITCH	48" TOD
$3	THREE–WAY TOGGLE SWITCH (SPDT)	48" TOD
$4	FOUR–WAY TOGGLE SWITCH (DPDT)	48" TOD
$K	KEY OPERATED SWITCH	48" TOD
$3OD	THREE WAY DIMMER SWITCH CONTROLLING FIXTURES INDICATED WITH LOWERCASE o.	48" TOD
$M	MANUAL STARTER WITH OVERLOADS	48" TOD
$P	SWITCH WITH PILOT LIGHT	48" TOD
$D	INCANDESCENT DIMMER SWITCH	48" TOD
$LV	LOW VOLTAGE CONTROL SWITCH	48" TOD
$T	MANUAL TIME SWITCH	48" TOD
$C	MOMENTARY CONTACT SWITCH	48" TOD
OS	OCCUPANCY SENSOR	
T	TIME CLOCK	
R	RELAY	
C	LIGHTING CONTACTOR	
P	PHOTOCELL OR PUSHPLATE SWITCH	
	FLUORESCENT LIGHTING FIXTURE – RECESSED, SURFACE, OR PENDANT MOUNTED, TYPE AS SPECIFIED	
	FLUORESCENT LIGHTING FIXTURE – 2 BALLAST	
	FLUORESCENT INDUSTRIAL LIGHTING FIXTURE	
	FLUORESCENT LIGHTING FIXTURE – WALL MOUNTED, TYPE AS SPECIFIED	
	LIGHTING FIXTURE – RECESSED, SURFACE, OR PENDANT MOUNTED	
	LIGHTING FIXTURE – WALL MOUNTED TYPE AS SPECIFIED	
	WALL WASHER	
	ADJUSTABLE WALL WASHER	
	LIGHTING FIXTURE ON EMERGENCY OR NIGHT LIGHT CIRCUIT	
	EMERGENCY BATTERY PACK WITH NUMBER OF HEADS INDICATED	
	EMERGENCY BATTERY PACK WITH REMOTE HEADS	
	REMOTE EMERGENCY HEAD	
	EMERGENCY BATTERY PACK – SEMI RECESSED, CEILING MOUNT	
	EXIT SIGN – CEILING OR PENDANT MOUNTED (SHADED PORTION INDICATES FACE)	
	EXIT SIGN – WALL MOUNTED – END, BACK	
	EXIT SIGN WITH DIRECTIONAL ARROWS	
	POLE MOUNTED LIGHTING FIXTURE – SINGLE, DOUBLE HEAD	
	POLE MOUNTED LIGHTING FIXTURE– SINGLE, POLE TOP	

SPECIAL SYSTEMS SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
	TELEPHONE OUTLET	18" CTR
E	TELEPHONE OUTLET, WALL MOUNTED	54" CTR
	TELEPHONE OUTLET, FLOOR MOUNTED	
	DATA/TELEPHONE OUTLET, UNSHADED AREA = DATA, SHADED AREA = VOICE, NUMERALS INDICATE QUANTITY OF WIRED JACKS	18" CTR
	DATA/TELEPHONE OUTLET, FLOOR MOUNTED, UNSHADED AREA = DATA, SHADED AREA = VOICE, NUMERALS INDICATE QUANTITY OF WIRED JACKS	
	DATA OUTLET, FLOOR MOUNTED	
E	TELEPHONE OUTLET – EMERGENCY	54" TOD
	DATA OUTLET	
	TELEVISION ANTENNA OUTLET	18" CTR
	TELEVISION SYSTEM SPLITTER – 2 WAY, 4 WAY	
	DATA/TELEPHONE OUTLET, CEILING MOUNTED	
	ROUGH IN JUNCTION BOX FOR CCTV CAMERA	

ELECTRICAL ABBREVIATIONS

A, AMP	– AMPERE	KVAR	– KILOVOLT AMPERES REACTIVE
AC	– ALTERNATING CURRENT	KW	– KILOWATTS
A/C	– AIR CONDITIONING	KWH	– KILOWATT HOUR
AFF	– ABOVE FINISHED FLOOR	LA	– LIGHTNING ARRESTOR
AFG	– ABOVE FINAL GRADE	LC	– LIGHTING CONTACTOR
AHU	– AIR HANDLING UNIT	LTG	– LIGHTING
AIC	– AMPS INTERRUPTING CAPACITY	LTNG	– LIGHTNING
ALT	– ALTERNATE	LP	– LIGHTING PANEL
ANN	– ANNUNCIATOR	LRA	– LOCKED ROTOR AMPERES
APPROX	– APPROXIMATELY	MATV	– MASTER ANTENNA TELEVISION
ARCH	– ARCHITECT	MCB	– MAIN CIRCUIT BREAKER
ATC	– AUTOMATIC TEMPERATURE CONTROL	MCC	– MOTOR CONTROL CENTER
		MEH	– METAL HALIDE
ATS	– AUTOMATIC TRANSFER SWITCH	MH	– MANHOLE, MOUNTING HEIGHT
AWG	– AMERICAN WIRE GAUGE	MLO	– MAIN LUGS ONLY
BAS	– BUILDING AUTOMATION SYSTEM	MSP	– MOTOR STARTER PANEL
BFC	– BELOW FINISHED CEILING	MTD	– MOUNTED
BFG	– BELOW FINISHED GRADE	MV	– MERCURY VAPOR
BLDG	– BUILDING	NC	– NORMALLY CLOSED
BOD	– BOTTOM OF DEVICE	NEC	– NATIONAL ELECTRICAL CODE
C, GND	– CONDUIT	NFSS	– NON–FUSED SAFETY SWITCH
CATV	– CABLE TELEVISION	NO	– NUMBER, NORMALLY OPEN
CB	– CIRCUIT BREAKER	OC	– ON CENTER
CCTV	– CLOSED CIRCUIT TELEVISION	OFCI	– OWNER FURNISHED CONTRACTOR INSTALLED
CKT	– CIRCUIT		
CL	– CURRENT LIMITING	OFOI	– OWNER FURNISHED OWNER INSTALLED
CLG	– CEILING		
CONN	– CONNECT	OH	– OVERHEAD
CPT	– CONTROL POWER TRANSFORMER	Ø, PH	– PHASE
CT	– CURRENT TRANSFORMER	P	– POLE
CTR	– CENTER	PB	– PUSHBUTTON
CU,CO	– COPPER	PF	– POWER FACTOR
CX	– CONNECT TO EXISTING	PFCC	– POWER FACTOR CORRECTION CAPACITOR
DC	– DIRECT CURRENT		
DISC	– DISCONNECT	PL	– PILOT LIGHT
DN	– DOWN	PLC	– PROGRAMMABLE LIGHTING CONTROL
DP	– DISTRIBUTION PANEL	PNL	– PANEL
DPST	– DOUBLE POLE SINGLE THROW	PP	– POWER PANEL
DPDT	– DOUBLE POLE DOUBLE THROW	PR	– PAIR
DT	– DOUBLE THROW	PT	– POTENTIAL TRANSFORMER
DWG	– DRAWING	PVC	– POLYVINYL CHLORIDE
E, EMERG	– EMERGENCY	Pp	– PUMP
EA	– EACH	QTY	– QUANTITY
EC	– EMPTY CONDUIT	RCS	– REMOTE CONTROL SWITCH
EF	– EXHAUST FAN	REC, RECPT	– RECEPTACLE
EH	– ELECTRIC HEATER	REQ'D	– REQUIRED
ELEC	– ELECTRIC	RFI	– RADIO FREQUENCY INTERFERENCE
ELEV	– ELEVATION	RGS	– RIGID GALVANIZED STEEL
ETR	– EXISTING TO REMAIN	RLA	– RUNNING LOAD AMPERES
EX	– EXISTING	RM	– ROOM
EXP	– EXPOSED	RVAT	– REDUCED VOLTAGE AUTO TRANSFORMER
EWC	– ELECTRIC WATER COOLER	RX	– REMOVE EXISTING
FR	– FRAME	SC	– SURGE CAPACITOR
FA	– FIRE ALARM	SEC	– SECONDARY
FAAP	– FIRE ALARM ANNUNCIATOR PANEL	SN, S/N	– SOLID NEUTRAL
FACP	– FIRE ALARM CONTROL PANEL	SP	– SURGE PROTECTION
FBO	– FURNISHED BY OTHERS	SPDT	– SINGLE POLE DOUBLE THROW
FC	– FAN COIL	SS	– SAFETY SWITCH
FDR	– FEEDER	SST	– SOLID STATE
FLA	– FULL LOAD AMPERES	ST	– SINGLE THROW
FLR	– FLOOR	SW	– SWITCH
FU	– FUSED AND FUSIBLE	SWBD	– SWITCHBOARD
FUSS	– FUSED SAFETY SWITCH	TBR	– TO BE REMOVED
FVR	– FULL VOLTAGE REVERSING	TC	– TIME CLOCK
FVNR	– FULL VOLTAGE NON–REVERSING	TEL, TELE	– TELEPHONE
GEN	– GENERATOR, GENERAL	TOD	– TOP OF DEVICE
GFI	– GROUND FAULT INTERRUPTER	TRANS/XFMR	– TRANSFORMER
GFR	– GROUND FAULT RELAY	TH	– TUNGSTEN HALOGEN
GRD	– GROUND	TTB	– TELEPHONE TERMINAL BOARD
GRS	– GALVANIZED RIGID STEEL	TW	– TWISTED
HID	– HIGH INTENSITY DISCHARGE	TYP	– TYPICAL
HOA	– HAND–OFF–AUTOMATIC	UG	– UNDERGROUND
HP	– HORSEPOWER	UH	– UNIT HEATER
HPS	– HIGH PRESSURE SODIUM	UON	– UNLESS OTHERWISE NOTED
HTR	– HEATER	V	– VOLTS
HV	– HIGH VOLTAGE	VFC	– VARIABLE FREQUENCY CONTROLLER
HZ	– HERTZ	W	– WATTS, WIRE
IG	– ISOLATED GROUND	W/	– WITH
JB	– JUNCTION BOX	WP	– WEATHER–PROOF
KCMIL	– THOUSAND CIRCULAR MILS	XP	– EXPLOSION PROOF
KV	– KILOVOLTS	2S1W	– 2 SPEED SINGLE WINDING
KVA	– KILOVOLT AMPERES	2S2W	– 2 SPEED DOUBLE WINDING

GENERAL NOTES:

1. THIS IS A STANDARD SYMBOL LIST, SOME SYMBOLS MAY NOT APPEAR ON THE ACCOMPANYING DRAWINGS.
2. REFER TO SPECIFICATIONS FOR DETAILED REQUIREMENTS.
3. PLAN & SECTION SYMBOLS MAY ALSO BE USED ON RISER DIAGRAMS.
4. ON SINGLE LINE DIAGRAMS FOR 3 PHASE SYSTEMS, DEVICE QUANTITY = 3 UNLESS OTHERWISE NOTED.
5. UNLESS OTHERWISE NOTED ALL INTERIOR CONDUITS AND BOXES SHALL BE CONCEALED.

RMF ENGINEERING, INC.
194 SEVEN FARMS DR., SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
FAX: 843-971-9641

STATE OF SOUTH CAROLINA — RMF ENGINEERING INC. CHARLESTON, SC C-00831 — REGISTERED ENGINEERS

SOUTH CAROLINA — LICENSED PROFESSIONAL SURVEYOR — No. 25022 — DENNIS M. SHIVER — 7/25/13

BIDDING DOCUMENTS

ZONE	REV	DESCRIPTION	DATE	APPROVED

REVISIONS

SCALE:	NONE	DATE:	7/22/13
DRAWN BY:	DMS	RMF JOB NO.:	312307.A0
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CHECKED BY:	DMS	OSE PROJECT #:	H27-6030-FW-B
PROJ. MGR.:	CRB	CLIENT DWG. #:	

GAMBRELL HALL REPAIRS
(4TH FLOOR HVAC RENOVATIONS)

University of South Carolina
Main Campus
COLUMBIA, SC

ELECTRICAL LEGEND & ABBREVIATIONS

E0.01

DEMOLITION NOTES:

1. EXISTING CONDITIONS SUCH AS LIGHTING, RECEPTACLES, ETC. WERE OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEYS AND ARE NOT WARRANTED TO BE COMPLETE OR CORRECT. CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL ELECTRICAL ITEMS IN THE FIELD PRIOR TO THE START OF ANY WORK.
2. SHOULD THE CONTRACTOR ENCOUNTER ANY MAJOR ELECTRICAL ITEMS, I.E. PANELS, FEEDERS, JUNCTION BOXES ETC. WHICH ARE NOT ADDRESSED ON THE DRAWINGS, HE SHALL BRING THEM TO THE ATTENTION OF THE ENGINEER. THE ENGINEER WILL REVIEW THE ITEM IN QUESTION AND GIVE THE NECESSARY DIRECTION.
3. THE OWNER SHALL BE GIVEN A FIRST RIGHT OF REFUSAL FOR ALL ELECTRICAL EQUIPMENT WHICH IS TO BE REMOVED. ALL ELECTRICAL EQUIPMENT WHICH IS DESIRED BY THE OWNER SHALL BE STORED ON THE SITE WHERE DIRECTED BY THE OWNER. THE CONTRACTOR SHALL PROMPTLY DISPOSE OF ALL ELECTRICAL ITEMS WHICH ARE REMOVED AND THE OWNER DOES NOT WANT TO KEEP.
4. IN GENERAL, ALL EXISTING ELECTRICAL DEVICES, LIGHTING FIXTURES, PANELS, CONDUITS, WIRING, JUNCTION BOXES, ETC. SHALL BE REMOVED IN THEIR ENTIRETY. THESE ITEMS ARE INDICATED WITH HEAVY HATCHED LINES. ITEMS THAT ARE EXISTING TO REMAIN ARE INDICATED WITH A LIGHT CONTINUOUS LINE.
5. ALL BRANCH CIRCUIT AND TELEPHONE WIRING WHICH MUST BE IN SERVICE AND WHICH IS DISCONNECTED AS A RESULT OF THE DEMOLITION WORK SHALL BE PROPERLY RECONNECTED.
6. EXISTING SMOKE DETECTORS AND DUCT SMOKE DETECTORS SHALL BE TEMPORARILY DISCONNECTED DURING DEMOLITION AND OTHER DUST PRODUCING ACTIVITIES. COORDINATE THE TEMPORARY DISCONNECTION WITH FACILITIES. ALL OTHER FIRE ALARM DEVICES MUST REMAIN IN OPERATION.
7. WHERE EXISTING DEVICES REMAIN IN WALLS WHICH RECEIVE A NEW FINISH, CONTRACTOR SHALL PROVIDE ALL NECESSARY OUTLET BOX EXTENSIONS, PLASTER RINGS, ETC. SO THAT DEVICES INSTALLED IN THE SAME MANNER AS EXISTING (I.E. FLUSH CONCEALED, ETC.).
8. CONTRACTOR SHALL DISCONENCT AND REMOVE ALL BRANCH CIRCUIT WIRING SERVING LIGHTING FIXTURES TO BE REMOVED. ALL BRANCH CIRCUIT WIRING SHALL BE REMOVED BACK TO SOURCE. CONTRACTOR SHALL NOT REUSE ANY EXISTING WIRING.

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GAMBRELL HALL REPAIRS
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FOURTH FLOOR PLAN – ELECTRICAL DEMOLITION

GRAPHIC SCALE
8 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

ED1.01

GENERAL NOTES:

1. SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR ACTUAL LOCATIONS OF ALL LIGHTING FIXTURES.
2. ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL BE CONNECTED AHEAD OF ANY SWITCHING.
3. CEILING MOUNTED LIGHTING FIXTURES SHALL BE SUPPORTED DIRECTLY FROM THE BUILDING STRUCTURE ACOUSTICAL CEILING SYSTEMS SHALL NOT SUPPORT ANY LIGHTING FIXTURES.
4. OCCUPANCY SENSORS SHALL BE LOCATED PER MANUFACTURER'S REQUIREMENTS. CONTRACTOR SHALL SUBMIT SHOP DRAWING INDICATING ACTUAL LOCATION OF OCCUPANCY SENSOR.
5. OCCUPANCY SENSORS SHALL BE SETUP SUCH THAT THE SENSOR WILL TURN THE LIGHTS ON AND OFF THE LOCAL SWITCH SHALL OVERRIDE THE SENSOR.
6. ALL NORMAL POWER LIGHTING CIRCUITS SHALL BE FED FROM PANEL LPE.
7. ALL EMERGENCY POWER LIGHTING CIRCUITS SHALL BE FED FROM PANEL ELP.
8. ALL EXIT SIGNS SHALL BE FED FROM PANEL ESP.
9. CIRCUIT NUMBERS ARE NOT SHOWN ON THE DRAWINGS. CONTRACTOR SHALL DETERMINE ACTUAL CIRCUIT NUMBERS IN THE FIELD. BALANCE ALL LOADS TO WITHIN 10 PERCENT ON EACH PHASE.

DRAWING NOTES:

1. REINSTALL LIGHTING FIXTURES AFTER MECHANICAL WORK IS COMPLETE. MAINTAIN EGRESS LIGHTING IN CORRIDORS AT ALL TIMES.
2. PROVIDE 120 VOLT CIRCUIT FOR VAV POWER. COORDINATE WITH CONTROLS CONTRACTOR. (TYPICAL)

1 APPLIES TO ALL LIGHTING FIXTURES

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GAMBRELL HALL REPAIRS (4TH FLOOR HVAC RENOVATIONS)

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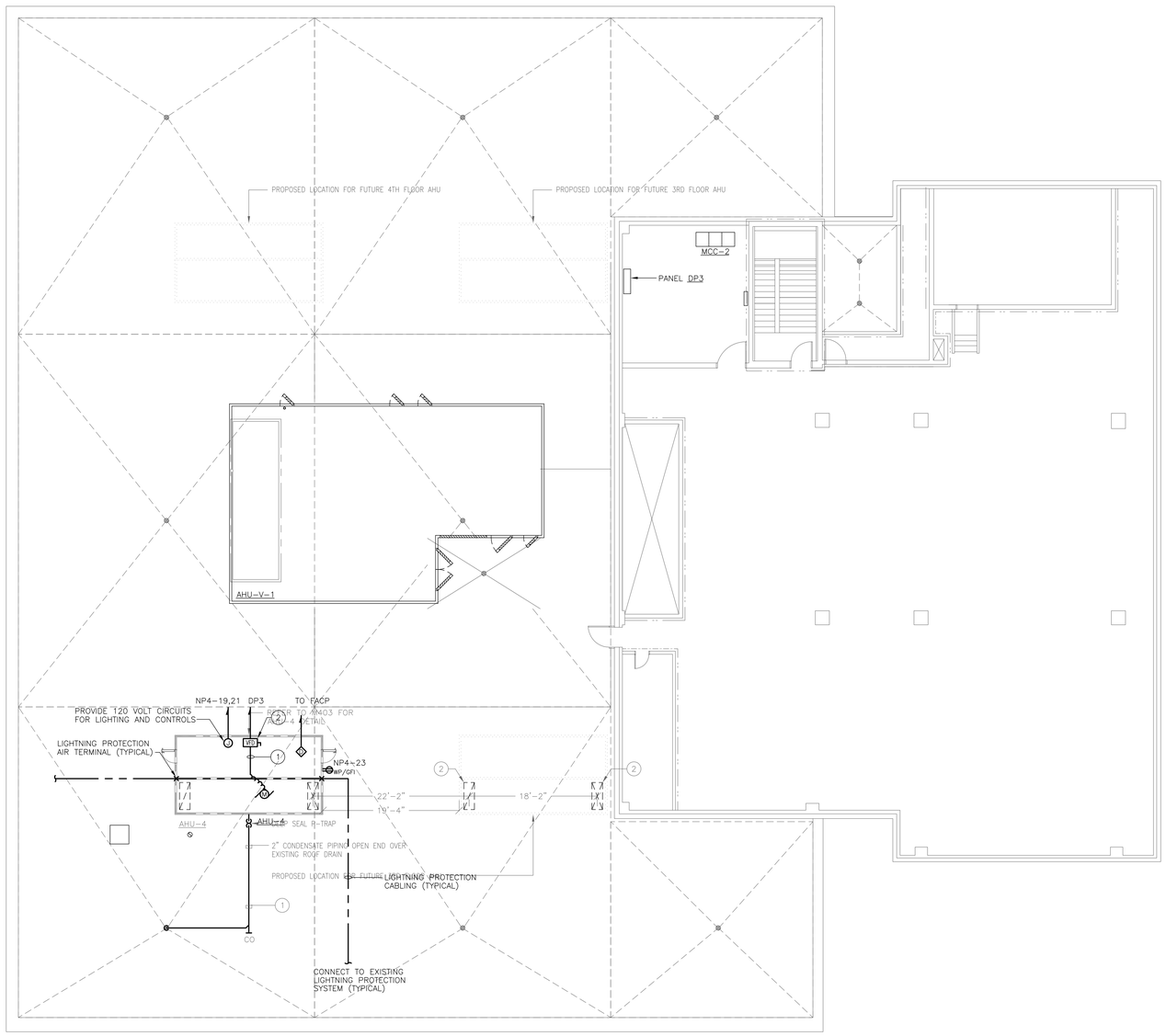
FOURTH FLOOR PLAN – ELECTRICAL NEW WORK

GRAPHIC SCALE
8 4 0 8 16
SCALE: 1/8"=1'-0"
UNIT OF MEASURE: FEET

E1.01

DRAWING NOTES:

1. SEE ONE-LINE DIAGRAM FOR CONDUIT AND WIRE SIZE.
2. VARIABLE FREQUENCY DRIVE FURNISHED BY DIVISION 23 WIRED AND INSTALLED BY DIVISION 26.



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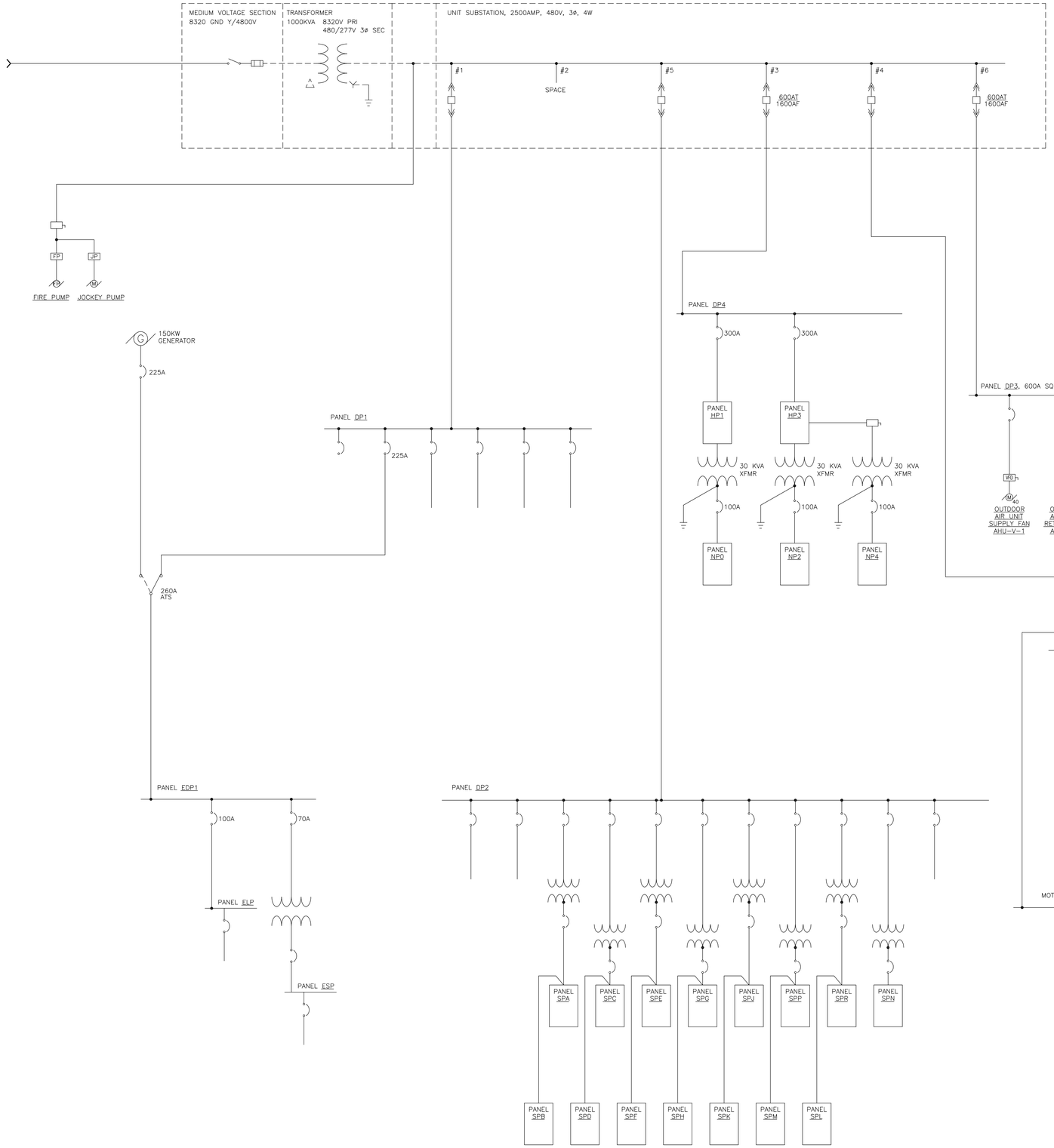
ROOF PLAN – ELECTRICAL NEW WORK

E1.02

DRAWING NOTES:

1. PROVIDE CIRCUIT BREAKER IN EXISTING PANEL DP3 CIRCUIT BREAKER SHALL MATCH EXISTING.
2. 3#6, 1#10 GND IN 1" CONDUIT.
3. CONNECT TO EXISTING SPARE CIRCUIT BREAKER.



PANELBOARD: NP4 MAINS: MLO AMPS: 100 MIN AIC: 10,000

LOCATION: ELEC 446 VOLTS: 120/208 PHASE: 3 WIRES: 4

MOUNTING: SURFACE ENCL NEMA: 1 NOTES: EXISTING SQ-D NQOD

	SERVES	CB P	CB TA	SPACE	BUS A	BUS B	BUS C	SPACE	CB TA	CB P	SERVES
	IHWH-1 – CUST 443	2	40	1	2.75			2	30	2	SPARE
	———	—	—	3		2.75		4	—	—	———
	SPARE	2	40	5			—	6	40	2	SPARE
	———	—	—	7	—			8	—	—	———
	SPARE	2	40	9		—		10	20	1	AIR TERMINAL BOX
	———	—	—	11	—			12	20	1	AIR TERMINAL BOX
3	**VAV POWER**	1	20	13		—		14	20	1	RECEPT – AHU-V-1
3	**VAV POWER**	1	20	15	—			16	20	1	LIGHTS – AHU-V-1
3	**VAV POWER**	1	20	17			—	18	20	1	UH – AHU-V-1
3	**LIGHTS – AHU-4**	1	20	19	—			20	20	1	FCU – AHU-V-1
3	**CONTROLS – AHU-4**	1	20	21		—		22	20	1	**VAV POWER** 3
3	**RECEPT – AHU-4**	1	20	23			—	24	20	1	SPARE
				25	—			26			
				27		—		28			
				29			—	30			
				31	—			32			
				33		—		34			
				35			—	36			
				37	—			38			
				39		—		40			
				41			—	42			
					2.75	2.75	0				

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ELECTRICAL ONE-LINE DIAGRAM

E5.01