

### MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT	
CLIMATE ZONE	3A - WARM/HUMID
WINTER DRY BULB:	23°F
SUMMER DRY BULB	95°F
INTERIOR DESIGN CONDITIONS	
WINTER DRY BULB	70°F
SUMMER DRY BULB	75°F
RELATIVE HUMIDITY	60% RH*
*DESIGN- NOT CONTROLLED	
BUILDING HEATING LOAD:	576.1 MBH
BUILDING COOLING LOAD:	797.8 MBH
MECHANICAL SPACING CONDITIONING SYSTEM SEE SCHEDULES	
UNITARY	
DESCRIPTION OF UNIT:	SEE SCHEDULES
HEATING EFFICIENCY:	SEE SCHEDULES
COOLING EFFICIENCY:	SEE SCHEDULES
SIZE CATEGORY OF UNIT:	SEE SCHEDULES
BOILER	
SIZE CATEGORY, IF OVERSIZED STATE REASON:	N/A
CHILLER	
SIZE CATEGORY, IF OVERSIZED STATE REASON:	N/A
LIST EQUIPMENT EFFICIENCIES:	SEE SCHEDULES

### MECHANICAL LEGEND

BC#	BRANCH CONTROLLER UNIT NUMBER
DAH#	DUCTLESS AIR HANDLING UNIT NUMBER
E#	EXHAUST GRILLE NUMBER
EDH#	ELECTRIC DUCT HEATER UNIT NUMBER
EUH#	ELECTRIC UNIT HEATER NUMBER
PV#	POWER VENTILATOR UNIT NUMBER
HP#	HEAT PUMP UNIT NUMBER
HU#	HUMIDIFIER UNIT NUMBER
IU#	INDOOR UNIT NUMBER
L#	LOUVER NUMBER
R#	RETURN GRILLE NUMBER
S#	SUPPLY DIFFUSER NUMBER
T#	TRANSFER GRILLE NUMBER
(X)	EXISTING
●	POINT OF CONNECTION
FD	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
M	MOTORIZED DAMPER
Ⓟ AH	THERMOSTAT
—LPC—LPC—	LOW PRESSURE CONDENSATE PIPING
—LPS—LPS—	LOW PRESSURE STEAM PIPING
—(X)C—(X)C—	EXISTING CONDENSATE PIPING
—(X)R—(X)R—	EXISTING REFRIGERANT PIPING
—C—C—	CONDENSATE PIPING
—R—R—	REFRIGERANT PIPING

### VENDOR EQUIPMENT NOTES

- THE OWNER FURNISHED EQUIPMENT (VENDOR) DOCUMENTS ARE AN INTEGRAL PART OF THESE CONTRACT DOCUMENTS FOR THIS PROJECT. ANY MATERIALS, LABOR, OR COORDINATION LISTED IN THE VENDOR DOCUMENTS AND SPECIFICALLY NOTED TO BE INCLUDED BY THE CONTRACTOR ARE TO BE FURNISHED AND INSTALLED UNDER THIS CONTRACT. REFER TO VENDOR DRAWINGS AND OWNER FURNISHED EQUIPMENT BROCHURES TO COORDINATE SIZE AND LOCATION OF ALL ROUGH-IN AND FINAL CONNECTION REQUIREMENTS FOR VENTING, EXHAUST CONNECTIONS, STEAM PIPING, CONDENSATE PIPING, TRAPS, VALVES, DRAINS, AND WATER CONNECTIONS.
- COORDINATE ROUGH-IN SIZES AND REQUIREMENTS WITH ACTUAL PURCHASED EQUIPMENT.

### SEISMIC RESTRAINT NOTES

- SEISMIC: INSTALL MECHANICAL WORK IN A MANNER TO BE FULLY COMPLIANT WITH THE SEISMIC RESTRAINT REQUIREMENTS OF THE NORTH CAROLINA STATE BUILDING CODE (NCSBC). THE CONTRACTOR SHALL PROVIDE ANY AND ALL SEISMIC RESTRAINT DETAILS AND CALCULATIONS THAT MAY BE REQUIRED BY THE NCSBC AND/OR THE AUTHORITY HAVING JURISDICTION. REQUIREMENTS FOR RESTRAINTS ARE DETAILED IN THE NCSBC. ALL TABLES AND REFERENCES SHALL CONFORM TO BUILDING'S LOCATION. RESTRAINTS SHALL BE PER SEISMIC PERFORMANCE CATEGORY STATED ON ARCHITECTURAL AND STRUCTURAL SHELL BUILDING DRAWINGS.

### ABBREVIATIONS

TERM	ABBREVIATION	TERM	ABBREVIATION
ABOVE FINISHED FLOOR	AFF	INCH OF WATER GAUGE	INWG
ABOVE GROUND	AG	INDOOR UNIT	IDU
ABOVE SEA LEVEL	ASL	IRON PIPE SIZE	IPS
ACROSS THE LINE	ACL	KILOVOLT-AMP	KVA
AIR ADMITTANCE VALVE	AAV	KILOWATT	KW
AIR CONDITION(ING, -ED)	AIR COND	KILOWATT HOUR	KWH
AIR-HANDLING UNIT	AHU OR AH	LEAVING AIR TEMPERATURE	LAT
AIR FLOW MEASURING STATION	AFMA	LEAVING WATER TEMPERATURE	LWT
AMBIENT	AMB	LENGTH	LG
AMPERE (AMP, AMPS)	AMP	LINEAR FEET	LF
ANALOG INPUT	AI	MAXIMUM	MAX
ANALOG OUTPUT	AO	MAXIMUM OVERCURRENT PROTECTION	MOCP
AND	&	MEDIUM-PRESSURE STEAM	MPS
APPARATUS DEW POINT	ADP	MILES PER HOUR	MPH
APPROXIMATE	APPROX	MINIMUM	MIN.
ARCHITECT	ARCH	MINIMUM CIRCUIT AMPERES	MCA
ATMOSPHERE	ATM	MINUTE	MIN
AVERAGE	AVG	MANUFACTURER	MFR
BRAKE HORSEPOWER	BHP	MOTOR CONTROL CENTER	MCC
BROWN & SHARPE WIRE GAGE	B&S	NOISE CRITERIA	NC
BRITISH THERMAL UNIT	BTU	NON-STANDARD PART LOAD	NPLV
BRITISH THERMAL UNIT PER HOUR	BTUH	NORMALLY OPEN	NO
1000 BRITISH THERMAL UNIT	MBH	NORMALLY CLOSED	NC
BUILDING	BLDG	NOT APPLICABLE	N/A
BUILDING AUTOMATION SYSTEM	BAS	NOT IN CONTRACT	N I C
CELSIUS	°C	NOT TO SCALE	NTS
CHILLED WATER RETURN	CHWR	NUMBER	NO
CHILLED WATER SUPPLY	CHWS	ON CENTER	OC
COEFFICIENT, VALVE FLOW	CV	OUNCE	OZ
COEFFICIENT OF PERFORMANCE FACTOR	COP	OUTDOOR UNIT	ODU
COMPRESSOR	COMP	OUTSIDE AIR	OA
CONCRETE	CONC	PACKAGE UNIT	PU
CONDENS(ER, -ING, -ATION)	COND	PACKAGE TERMINAL AIR CONDITIONER	PTAC
CONNECTION	CONN	PARTS PER MILLION	PPM
CONTINUATION	CONT	PERCENT	%
COOLING LOAD	CLG LOAD	PHASE	PH
CUBIC FEET	CU FT	POUNDS	LBS
CUBIC INCH	CU IN	POUNDS PER SQUARE FOOT	PSF
CUBIC FEET PER MINUTE	CFM	POWER VENTILATOR	PV
CFM, STANDARD CONDITIONS	SCFM	PRESSURE	PRESS
DECIBEL	DB	PRESSURE REDUCING VALVE	PRV
DEGREE	DEG OR °	PRESSURE SAFETY VALVE	PSV
DEDICATED OUTDOOR AIR SYSTEM	DOAS	PUMPED CONDENSATE	PC
DEGREES FAHRENHEIT	DEG. F	QUANTITY	QTY
DETAIL	DET	RATED LOAD AMPS	RLA
DEW-POINT TEMPERATURE	DPT	RECIRCULATE	RECIRC
DIAMETER	DIA	REDUCED PRESSURE BACKFLOW PREVENTER	RPZ
DIAMETER, INSIDE	ID	REFRIGERANT (12, 22, ETC.)	R22, R410
DIAMETER, OUTSIDE	OD	REFRIGERANT LIQUID	RL
DIFFERENCE OR DELTA	DIFF	REFRIGERANT SUCTION	RS
DIGITAL INPUT	DI	REQUIRED	REQD OR REQ'D
DIGITAL OUTPUT	DO	RELATIVE HUMIDITY	RH
DOMESTIC HOT WATER	DHW	RETURN AIR	RA
DOMESTIC HOT WATER RECIRCULATION	DHWR	REVOLUTIONS PER MINUTE	RPM
DRY-BULB TEMPERATURE	DBT	REVOLUTIONS PER SECOND	RPS
DUCTLESS SPLIT SYSTEM AIR HANDLER	DAH	ROOF VENTILATOR	RV
DUCTLESS SPLIT SYSTEM HEAT PUMP	DHP	ROOF TOP UNIT	RTU
ENERGY EFFICIENCY RATING	ERR	SAFETY FACTOR	SF
EFFICIENCY	EFF	SEASONAL ENERGY EFFICIENCY RATIO	SEER
ELECTRIC UNIT HEATER	EUH	SECOND	S
ELEVATION	EL	SHADING COEFFICIENT	SC
ENTERING	ENT	SPECIFICATION	SPEC
ENTERING WATER TEMPERATURE	EWT	SQUARE	SC
ENTERING AIR TEMPERATURE	EAT	STANDARD	STD
EXISTING	(X)	STATIC PRESSURE	SP
EXTERNAL AMBIENT TEMPERATURE	EAT	SUPPLY	SPLY
EXTERNAL STATIC PRESSURE	ESP	SUPPLY AIR	SA
EXHAUST AIR	EA	TEMPERATURE	TEMP
EXHAUST FAN	EF	TEMPERATURE DIFFERENCE	TD
FACE VELOCITY	FVEL	THERMOSTAT	T STAT
FAHRENHEIT	°F	TONS OF REFRIGERATION	TONS
FIRE DAMPER	FD	TO BE DETERMINED	TBD
FIRE/SMOKE DAMPER	FSD	TOP OF STEEL	TOS
FEET PER MINUTE	FPM	TOTAL DYNAMIC HEAD	TDH
FEET PER SECOND	FPS	TYPICAL	TYP
FULL LOAD AMPS	FLA	U-FACTOR	U
GAGE OR GAUGE	GA	UNDER GROUND	UG
GALLONS	GAL	UNLESS OTHERWISE NOTED	UNON
GALLONS PER HOUR	GPH	UNIT HEATER - ELECTRIC	UH
GALLONS PER MINUTE	GPM	VARIABLE AIR VOLUME	VAV
GALLONS PER DAY	GPD	VARIABLE FREQUENCY DRIVE	VFD
GAS UNIT HEATER	GUH	VELOCITY	VEL
GRAINS	GR	VENTILATION, VENT	VENT
HEAD	HD	VENT THRU ROOF	VTR
HEAT EXCHANGER	HX	VERTICAL	VERT
HEATING AND VENTILATION UNIT	HV	VOLT	V
HEATING, VENTILATION AND AIR CONDITIONING	HVAC	VOLT AMPERE	VA
HEIGHT	HGT	VOLUME	VOL
HERTZ	HZ	WATER PRESSURE DROP	WPD
HIGH DENSITY POLYPROPYLENE	HDPE	WATER GAUGE	WG
HIGH-PRESSURE STEAM	HPS	WATT	W
HORSEPOWER, HEAT PUMP	HP	WATT-HOUR	WH
HOT WATER COIL	HWC	WITH	W/
HOUR(S)	HR	WEIGHT	WT
HUMIDITY, RELATIVE	RH	WET BULB	WB
INTEGRATED PART LOAD VALUES	IPLV	YARD	YD
INCH	IN.	YEAR	YR

NOTE: ALL ABBREVIATIONS MAY NOT BE USED IN PROJECT.

**BECKER  
MORGAN  
GROUP**

ARCHITECTURE  
PLANNING

Wilmington, NC

3333 Jaeckle Drive, Suite 120  
Wilmington, NC 28403

910.341.7600

Salisbury, MD

312 West Main St. Suite 300  
Salisbury, MD 21801

410.546.9100

309 S Governors Ave  
Dover, DE 19904

302.734.7950

www.beckermorgan.com

**ADAMS  
SOUTHEASTERN  
CONSTRUCTION**

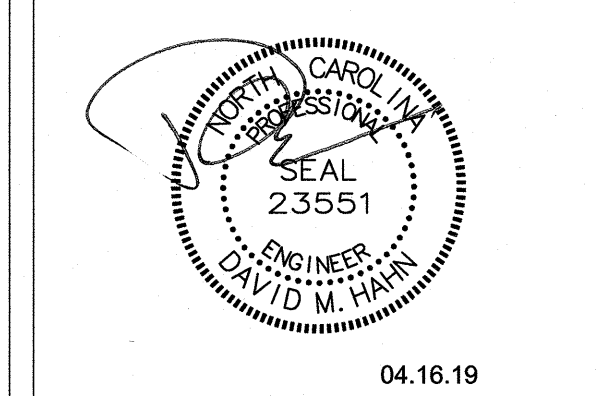
**CBHF**  
Engineers, PLLC

2246 Yaupon Drive Phone: 910.791.4000

Wilmington, NC 28401 Fax: 910.791.5266

www.cbhfenr.com

© Copyright 2019 NCR P-0506



PROJECT TITLE

BRUNSWICK  
AMBULATORY  
SURGERY CENTER  
LELAND, NC

SHEET TITLE

MECHANICAL  
SUMMARY, LEGEND  
AND ABBREVIATIONS

ISSUE BLOCK

0 04.16.19 ISSUED FOR CONSTRUCTION

MARK DATE DESCRIPTION

PROJECT NO: 2016248.01

DATE: 10.26.2018

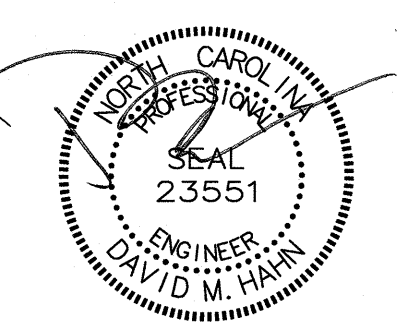
SCALE: AS NOTED

DRAWN BY: GRM PROJ MGR: DMH

**M-001**

COPYRIGHT © 2019



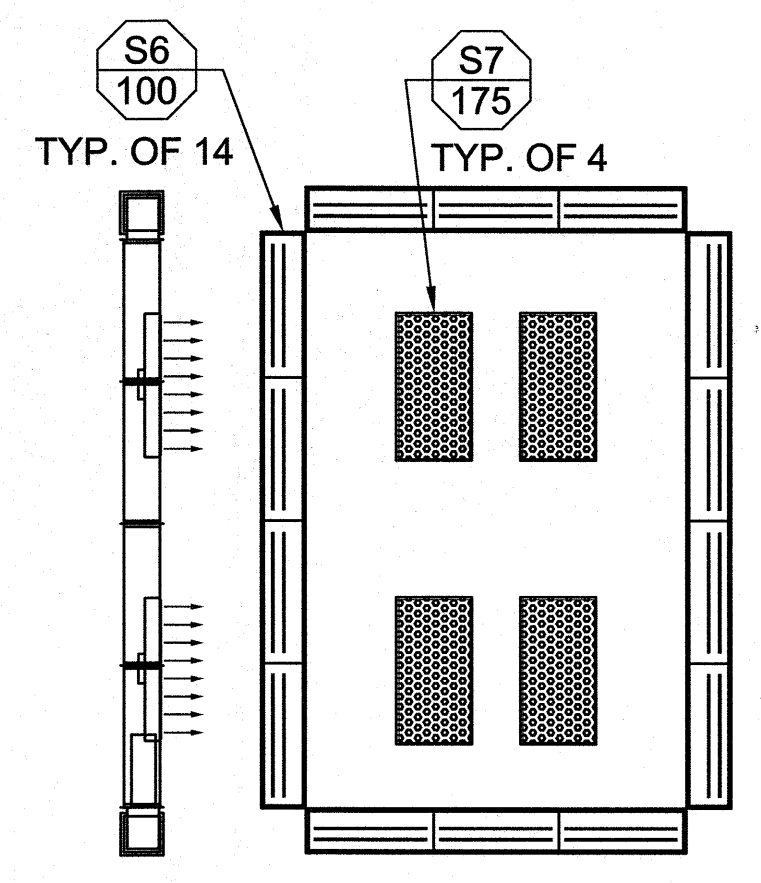
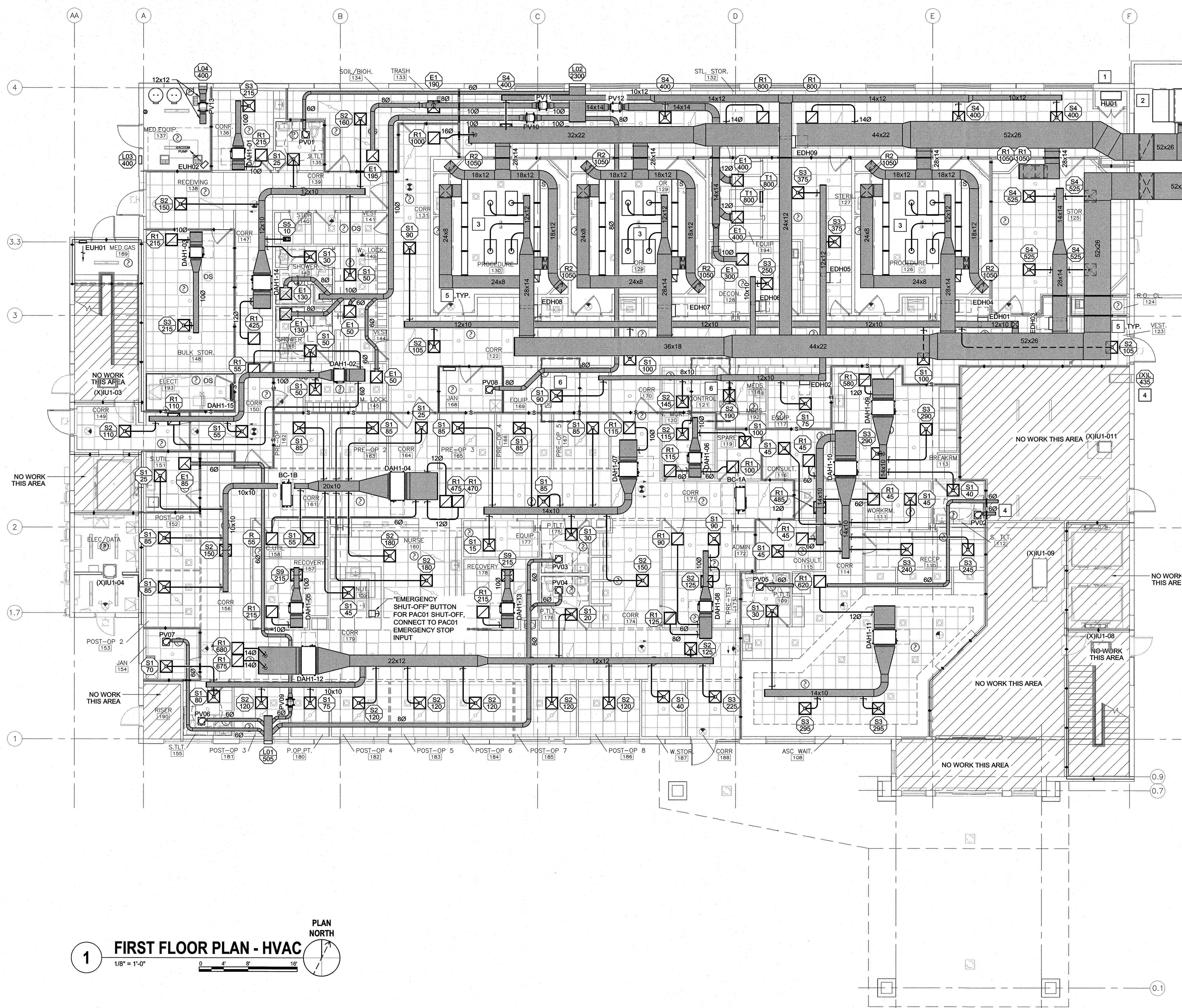


PROJECT TITLE  
**BRUNSWICK AMBULATORY SURGERY CENTER**  
 LELAND, NC

SHEET TITLE  
**FIRST FLOOR PLAN - HVAC, SA, RA AND EA**

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION
PROJECT NO:	2016248.01	
DATE:	10.26.2018	
SCALE:	AS NOTED	
DRAWN BY:	GRM	PROJ MGR: DMH

**M-101**  
 COPYRIGHT © 2019



**2 SPECIALTY DIFFUSER PLAN**  
 3/16" = 1'-0"  
 (ROOMS 126, 129 AND 130)

**GENERAL NOTES**

- COORDINATE DUCT ELEVATIONS AND ROUTING WITH OTHER TRADES PRIOR TO INSTALLATION.
- MAINTAIN MANUFACTURER'S CLEARANCE REQUIREMENTS FOR INDOOR AND OUTDOOR EQUIPMENT.
- REFER TO ARCHITECTURAL DRAWINGS FOR RATED UL NUMBERS (WALLS, FLOOR / CEILINGS, ETC.).
- REFRIGERANT PIPING OMITTED FOR CLARITY. FIELD ROUTE NUMBERS REFRIGERANT PIPING FROM OUTDOOR UNITS TO INDOOR UNITS IN CEILING CAVITY PER VRF SCHEMATICS AND MANUFACTURER'S REQUIREMENTS.
- COORDINATE CONDENSATE PIPE ROUTING WITH GENERAL CONTRACTOR AND OWNER, TYPICAL.
- CONCERNING DIFFUSER LAYOUT AND CEILING TYPE, REFER TO ARCHITECTURAL PLANS FOR FURTHER INFORMATION.

**KEYED NOTES**

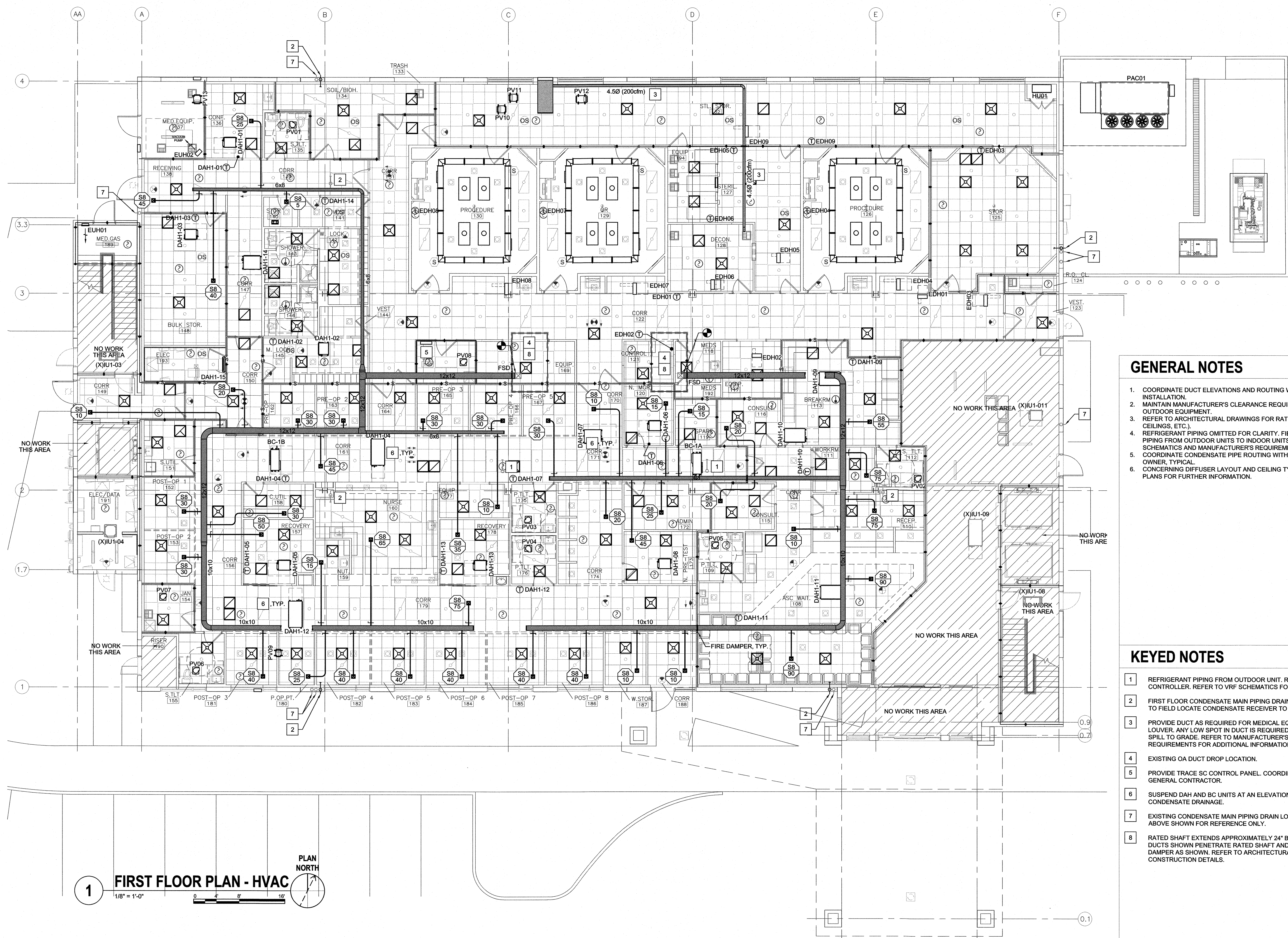
- REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS TO PROVIDE A COMPLETE AND WORKING SYSTEM.
- PROVIDE CONDENSATE DRAIN PIPING FOR HUMIDIFIER HU01 THROUGH EXTERIOR WALL AND DRAIN TO HUB DRAIN IN MECHANICAL COURTYARD.
- REFER TO PLAN 2/M-101 FOR DIFFUSER INFORMATION.
- EXTEND 60 EXHAUST DUCT TO EXISTING LOUVER.
- PROVIDE DOUBLE THICKNESS TURNING VANES IN ALL NON-RADIUS ELBOWS.
- RATED SHAFT EXTENDS APPROXIMATELY 24" BELOW SECOND FLOOR DECK. DUCTS SHOWN ARE BELOW BOTTOM CAP OF RATED SHAFT. REFER TO ARCHITECTURAL DRAWINGS FOR SHAFT CONSTRUCTION DETAILS.

**FIRE WALL LEGEND**

1-HOUR RATED WALL	—
1-HOUR RATED SMOKE BARRIER	—S—

**1 FIRST FLOOR PLAN - HVAC**  
 1/8" = 1'-0"  
 PLAN NORTH





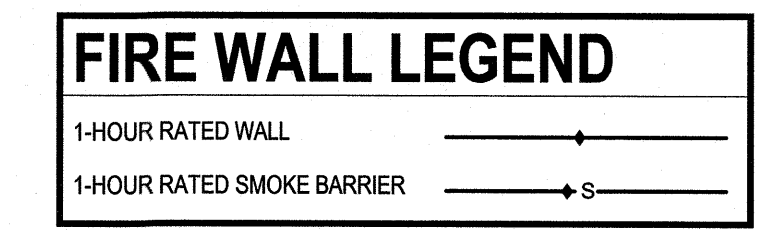
**1** FIRST FLOOR PLAN - HVAC  
 1/8" = 1'-0"  
 PLAN NORTH

**GENERAL NOTES**

1. COORDINATE DUCT ELEVATIONS AND ROUTING WITH OTHER TRADES PRIOR TO INSTALLATION.
2. MAINTAIN MANUFACTURER'S CLEARANCE REQUIREMENTS FOR INDOOR AND OUTDOOR EQUIPMENT.
3. REFER TO ARCHITECTURAL DRAWINGS FOR RATED UL NUMBERS (WALLS, FLOOR / CEILINGS, ETC.).
4. REFRIGERANT PIPING OMITTED FOR CLARITY. FIELD ROUTE VRF REFRIGERANT PIPING FROM OUTDOOR UNITS TO INDOOR UNITS IN CEILING CAVITY PER VRF SCHEMATICS AND MANUFACTURER'S REQUIREMENTS.
5. COORDINATE CONDENSATE PIPE ROUTING WITH GENERAL CONTRACTOR AND OWNER, TYPICAL.
6. CONCERNING DIFFUSER LAYOUT AND CEILING TYPE, REFER TO ARCHITECTURAL PLANS FOR FURTHER INFORMATION.

**KEYED NOTES**

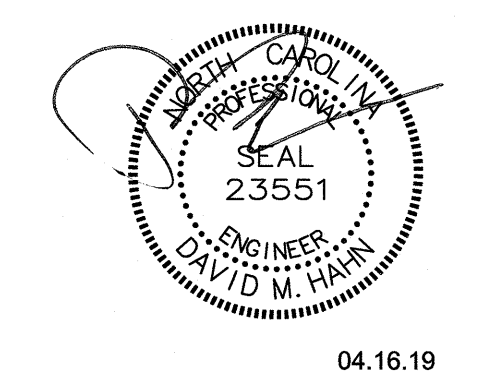
- 1 REFRIGERANT PIPING FROM OUTDOOR UNIT. ROUTE TO RESPECTIVE BC CONTROLLER. REFER TO VRF SCHEMATICS FOR ADDITIONAL INFORMATION.
- 2 FIRST FLOOR CONDENSATE MAIN PIPING DRAIN LOCATIONS. CONTRACTOR TO FIELD LOCATE CONDENSATE RECEIVER TO ACHIEVE GRAVITY DRAINAGE.
- 3 PROVIDE DUCT AS REQUIRED FOR MEDICAL EQUIPMENT AND ROUTE TO LOUVER. ANY LOW SPOT IN DUCT IS REQUIRED TO DRAIN CONDENSATE AND SPILL TO GRADE. REFER TO MANUFACTURER'S INSTALLATION REQUIREMENTS FOR ADDITIONAL INFORMATION.
- 4 EXISTING OA DUCT DROP LOCATION.
- 5 PROVIDE TRACE SC CONTROL PANEL. COORDINATE FINAL LOCATION WITH GENERAL CONTRACTOR.
- 6 SUSPEND DAH AND BC UNITS AT AN ELEVATION TO SUPPORT GRAVITY CONDENSATE DRAINAGE.
- 7 EXISTING CONDENSATE MAIN PIPING DRAIN LOCATIONS FROM FLOORS ABOVE SHOWN FOR REFERENCE ONLY.
- 8 RATED SHAFT EXTENDS APPROXIMATELY 24" BELOW SECOND FLOOR DECK. DUCTS SHOWN PENETRATE RATED SHAFT AND REQUIRE A FIRE/SMOKE DAMPER AS SHOWN. REFER TO ARCHITECTURAL DRAWINGS FOR SHAFT CONSTRUCTION DETAILS.



**BECKER MORGAN GROUP**  
 ARCHITECTURE PLANNING  
 Wilmington, NC  
 3333 Jaecle Drive, Suite 120  
 Wilmington, NC 28403  
 910.341.7600  
 Salisbury, MD  
 312 West Main St. Suite 300  
 Salisbury, MD 21801  
 410.546.9100  
 Dover, DE  
 309 S Governors Ave  
 Dover, DE 19904  
 302.734.7950  
 www.beckermorgan.com

**ADAMS SOUTHEASTERN CONSTRUCTION**

**CBHF Engineers, PLLC**  
 2246 Yaupon Drive Phone: 910.791.4000  
 Wilmington, NC 28401 Fax: 910.791.5266  
 © Copyright 2019 www.cbhfenr.com NCR P-0506



PROJECT TITLE  
**BRUNSWICK AMBULATORY SURGERY CENTER**  
 LELAND, NC

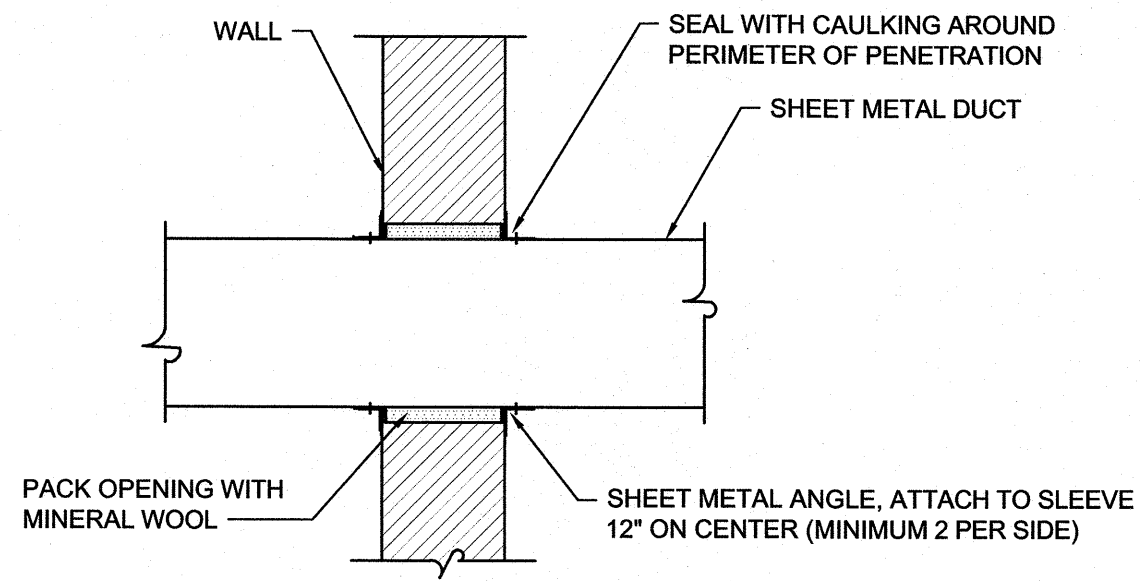
SHEET TITLE  
**FIRST FLOOR PLAN - HVAC, OA, SENSOR, REFRIGERANT AND CONDENSATE PIPING**

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION

PROJECT NO: 2016248.01  
 DATE: 10.26.2018  
 SCALE: AS NOTED  
 DRAWN BY: GRM PROJ MGR: DMH

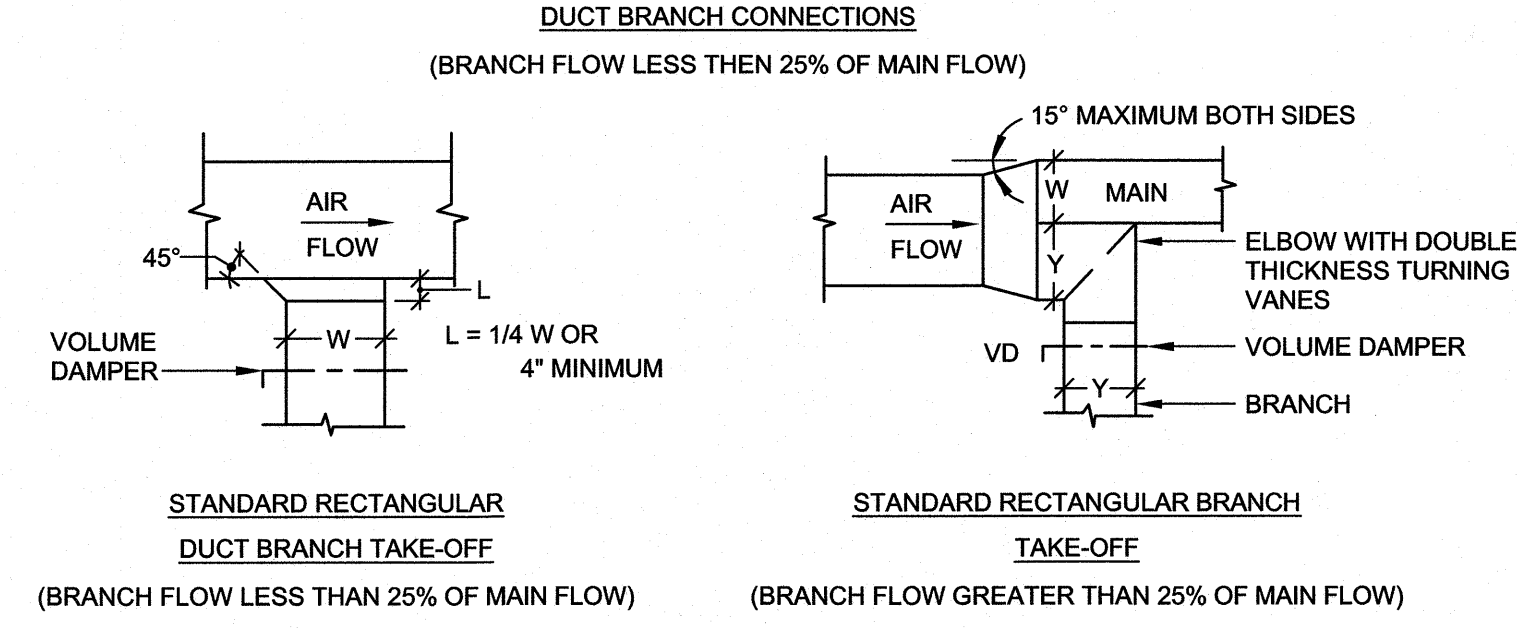
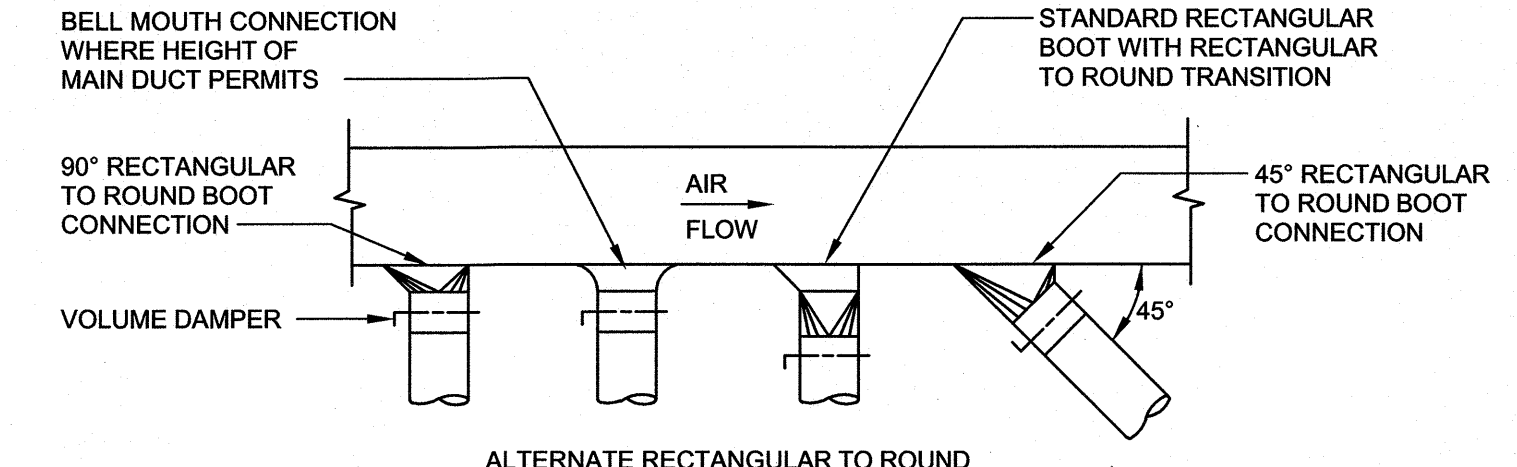
**M-102**  
 COPYRIGHT © 2019



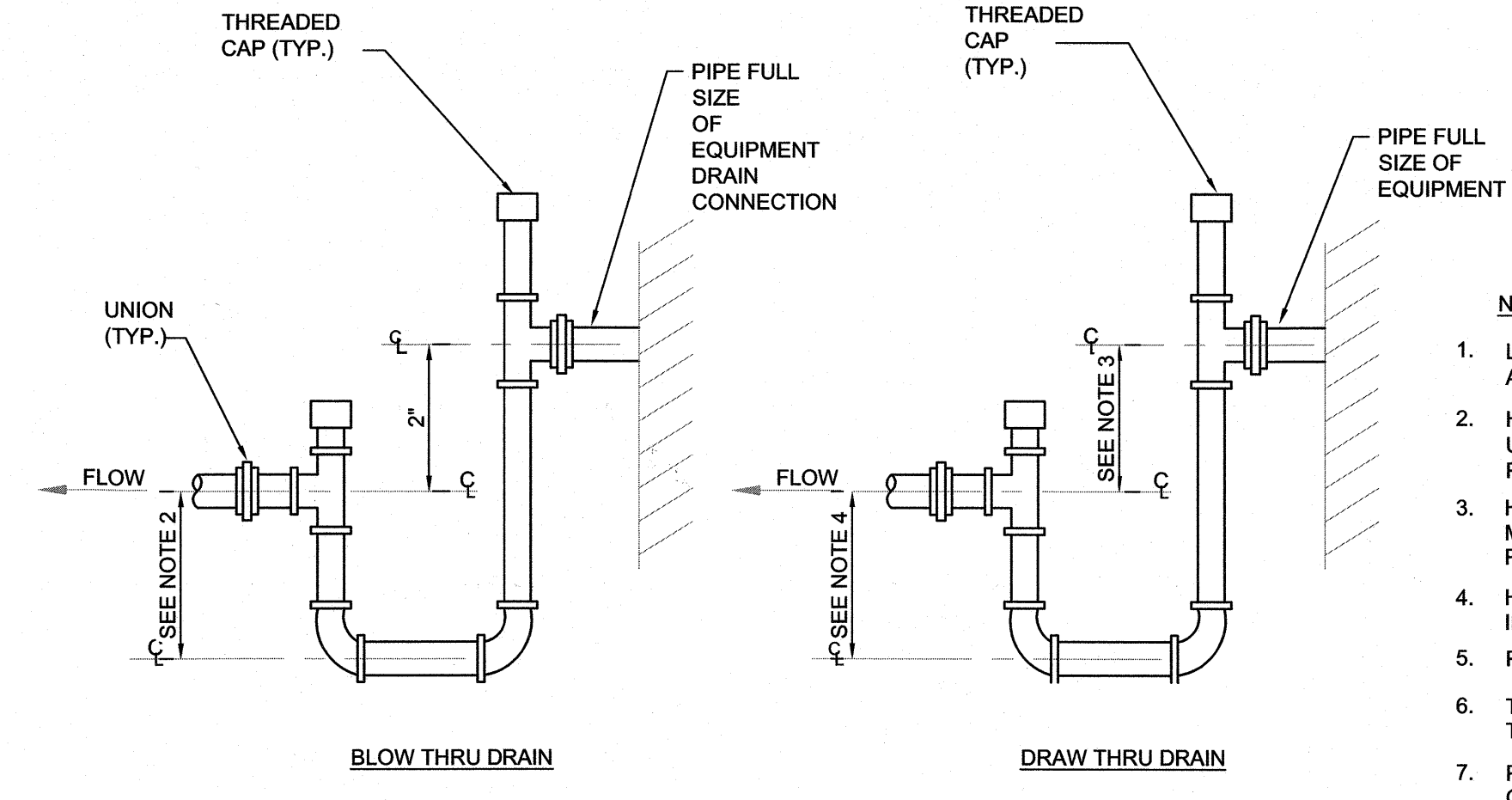


NOTE: EXTERNALLY WRAPPED DUCT INSTALLED SIMILARLY. BLANKET INSULATION SHALL BE INSTALLED OVER ANGLES AND SEALED TO WALL BARRIER.

**1** TYPICAL THROUGH NON-RATED WALL DETAIL  
NOT TO SCALE



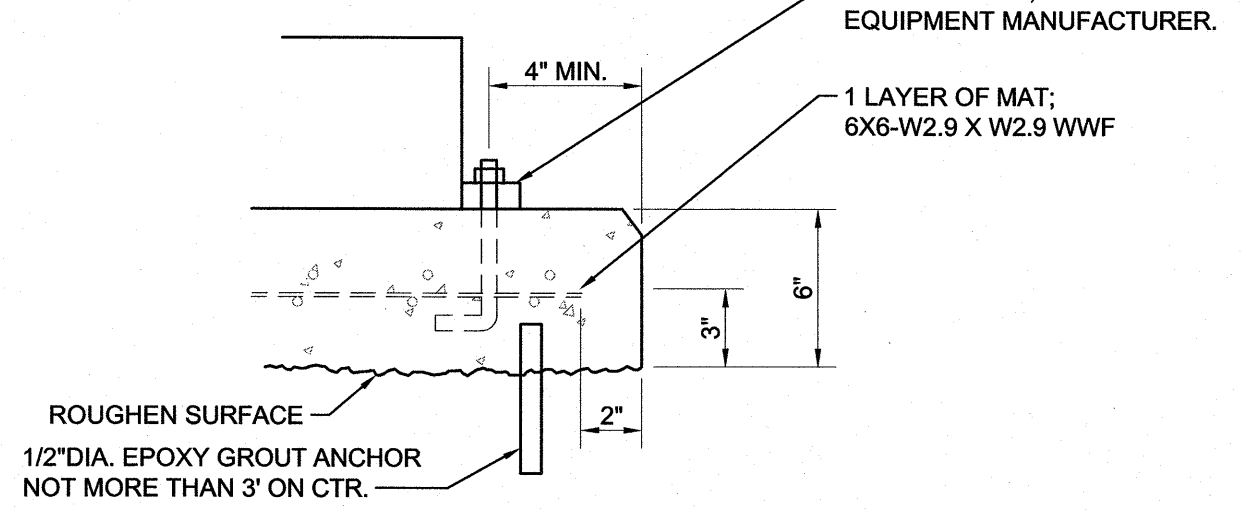
**2** DUCT FITTING DETAILS  
NOT TO SCALE



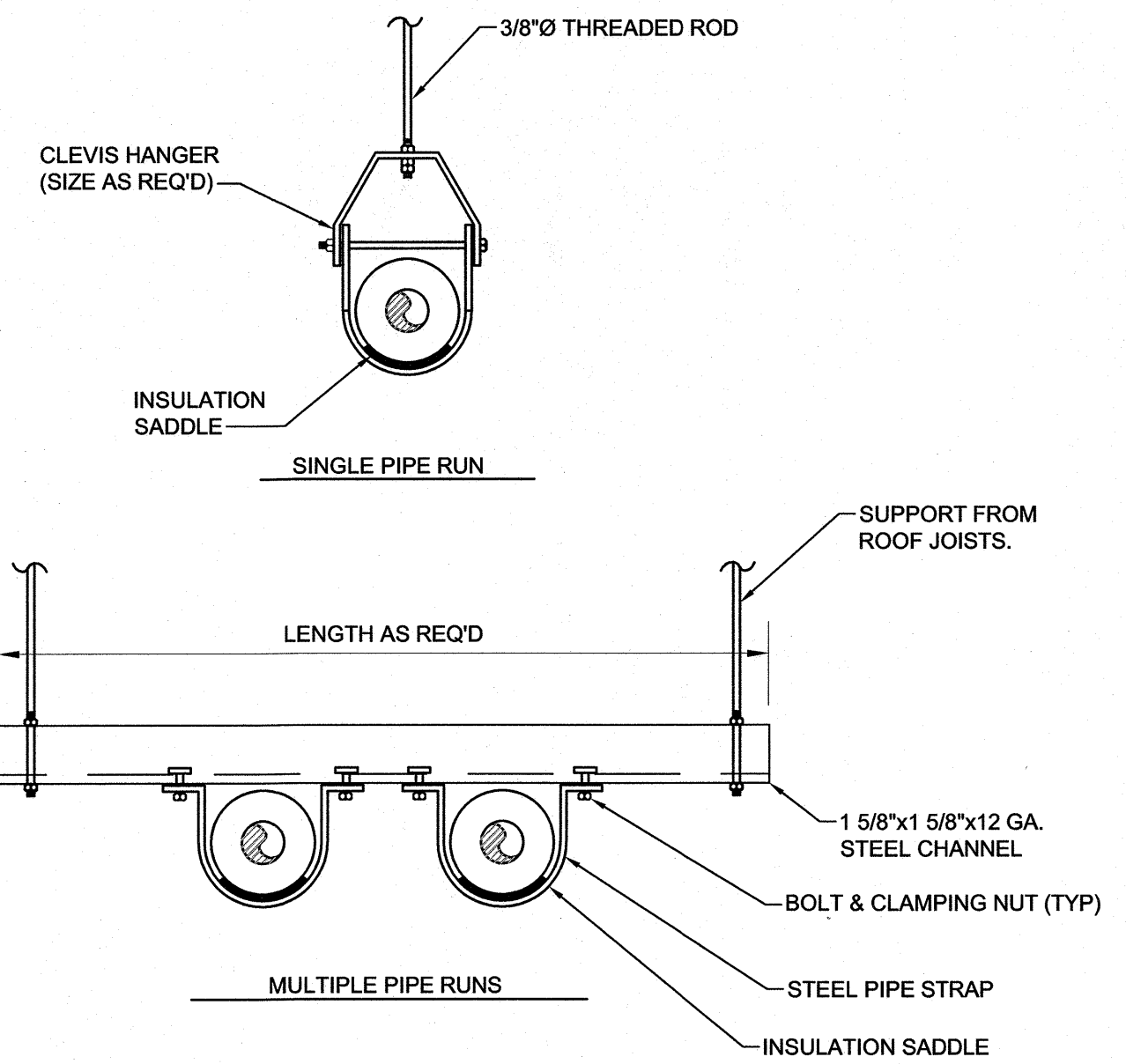
- NOTES:
1. LOCATE TRAPS SO AS TO BE ACCESSIBLE FOR CLEANING.
  2. HEIGHT SHALL BE EQUAL TO UNIT MAXIMUM TOTAL STATIC PRESSURE PLUS 1/2"
  3. HEIGHT SHALL BE EQUAL TO UNIT MAXIMUM NEGATIVE STATIC PRESSURE PLUS 1"
  4. HEIGHT SHALL BE 1/2 OF HEIGHT INSTALLED IN NOTE 3
  5. PIPE TO NEAREST DRAIN.
  6. TRAP SHALL NOT BLOCK ACCESS TO EQUIPMENT.
  7. PROVIDE UNIONS AT INLET AND OUTLET OF TRAP.

**3** CONDENSATE DRAIN TRAP AND PIPING DETAIL  
NOT TO SCALE

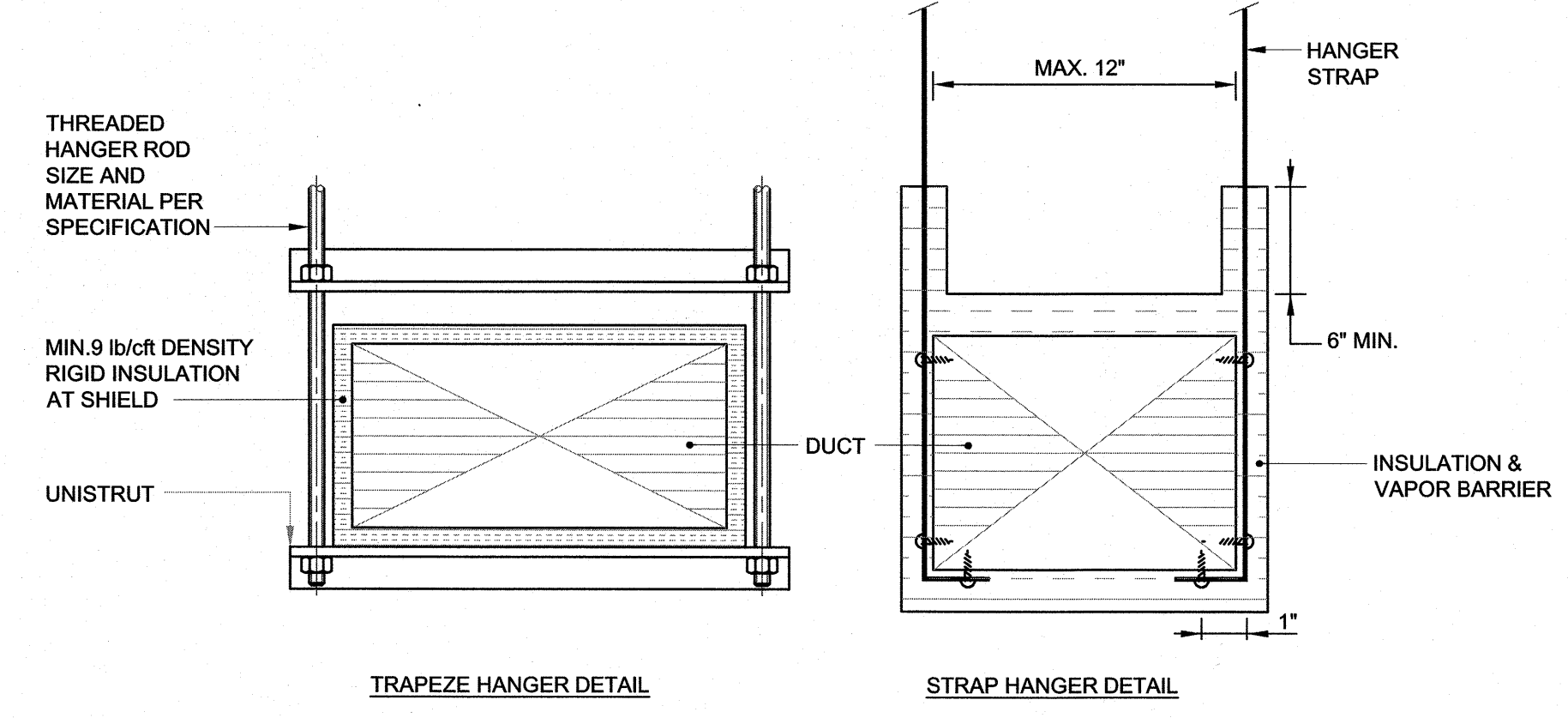
- NOTE:
1. MESH SHALL BE FURNISHED IN SHEETS.
  2. ALL PAD EDGES SHALL BE CHAMFERED.
  3. CONCRETE COMPRESSIVE STRENGTH SHALL BE 3,000 PSI AT 28 DAYS
  4. ONLY ANCHOR EQUIPMENT WITH MANUFACTURER SUPPLIED ANCHOR MOUNTS



**4** EQUIPMENT PAD DETAIL  
NOT TO SCALE

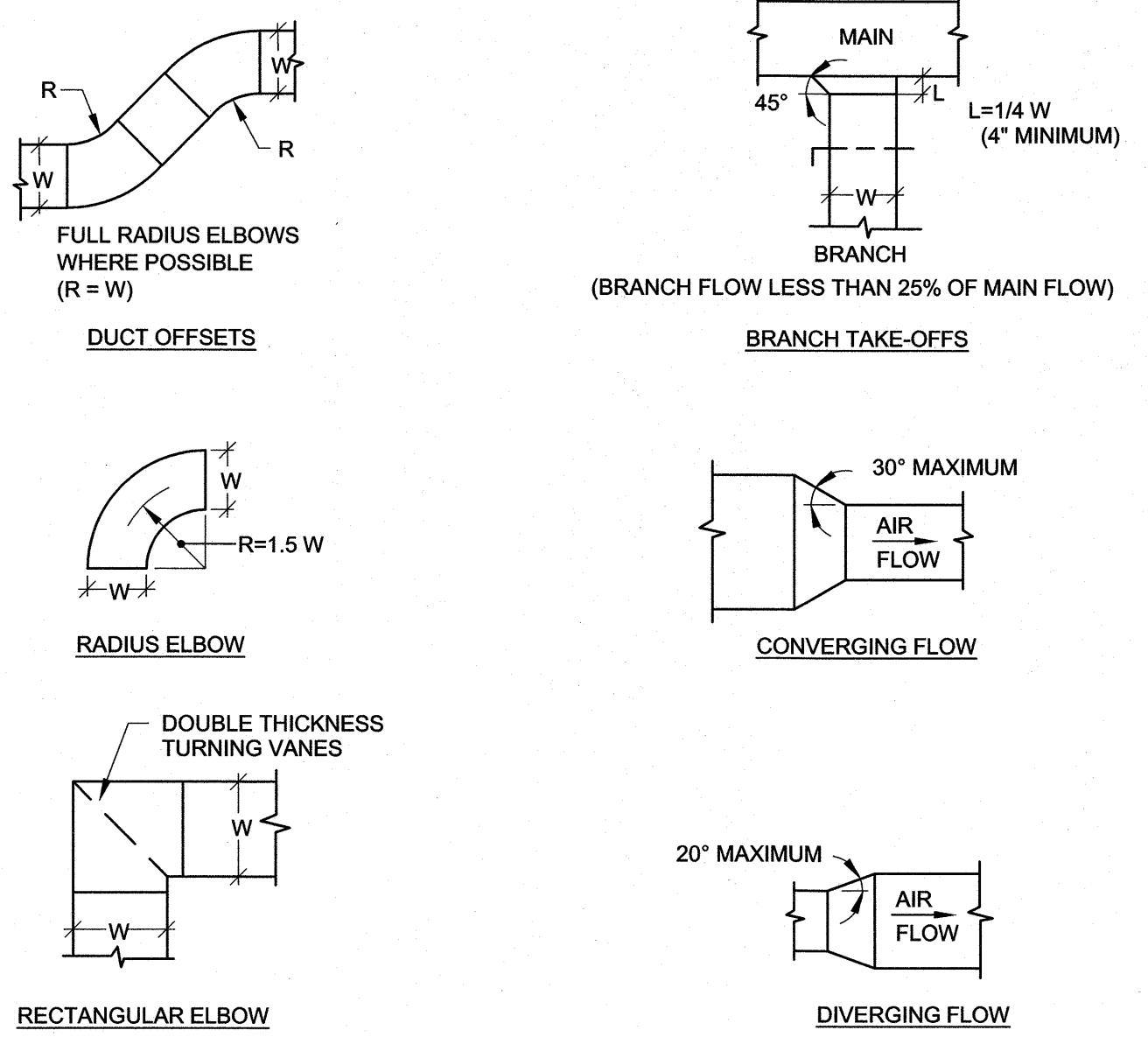


**5** PIPE SUPPORT DETAIL  
NOT TO SCALE

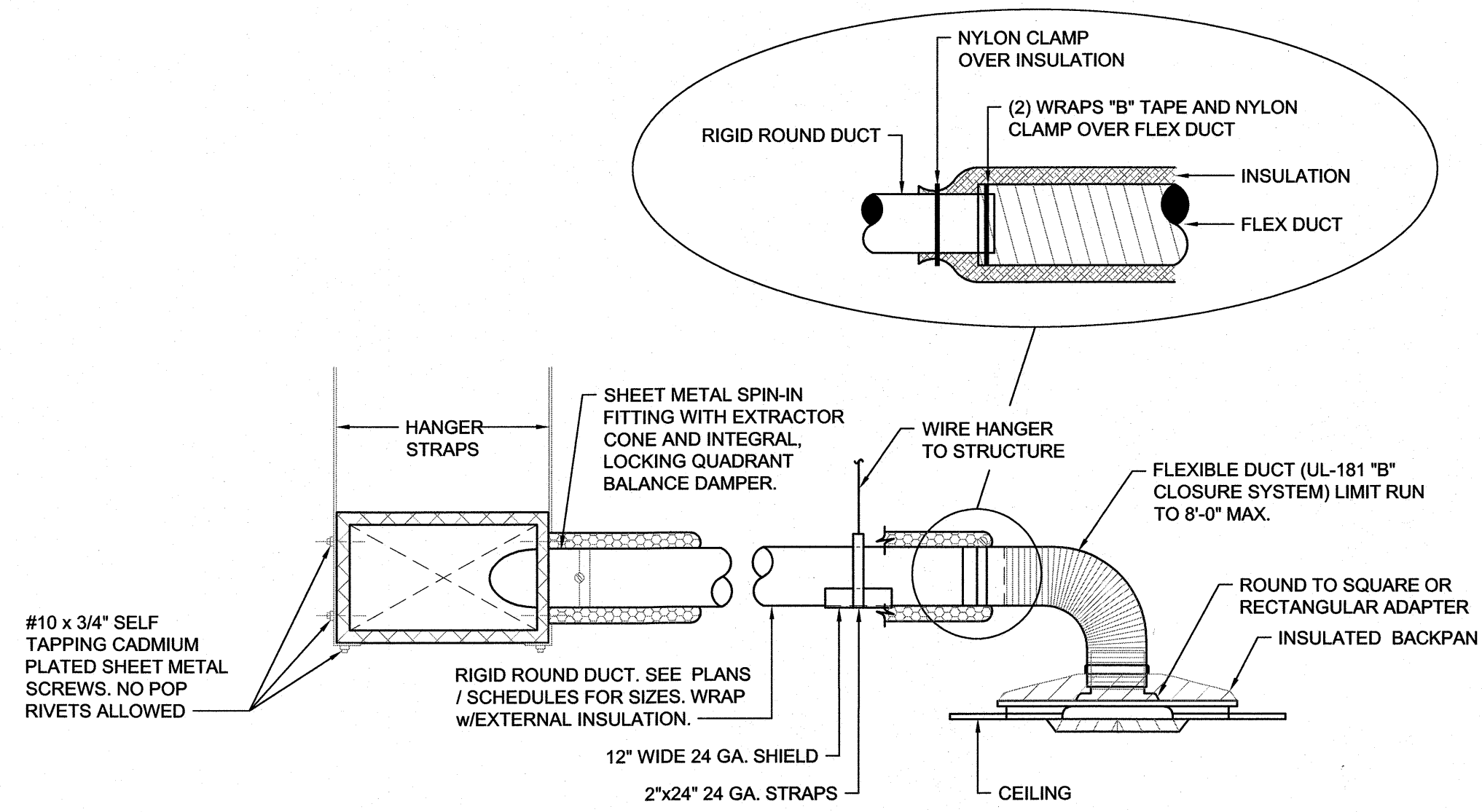


- NOTES:
1. TRAPEZE HANGERS SHALL BE PROVIDED FOR ALL DUCT WORK. TRAPEZE HANGERS CANNOT BE USED FOR BRANCH DUCT WORK 12" IN WIDTH AND SHORTER REFER TO STRAP HANGER DETAIL.
  2. SUPPORTS SHALL BE SPACED AND SIZED AS PER SPECIFICATIONS.
  3. RIGID INSULATION SHALL EXTEND MINIMUM OF 3" BEYOND STRUT ON BOTH SIDES. MAINTAIN VAPOR BARRIER ACROSS STRUT.

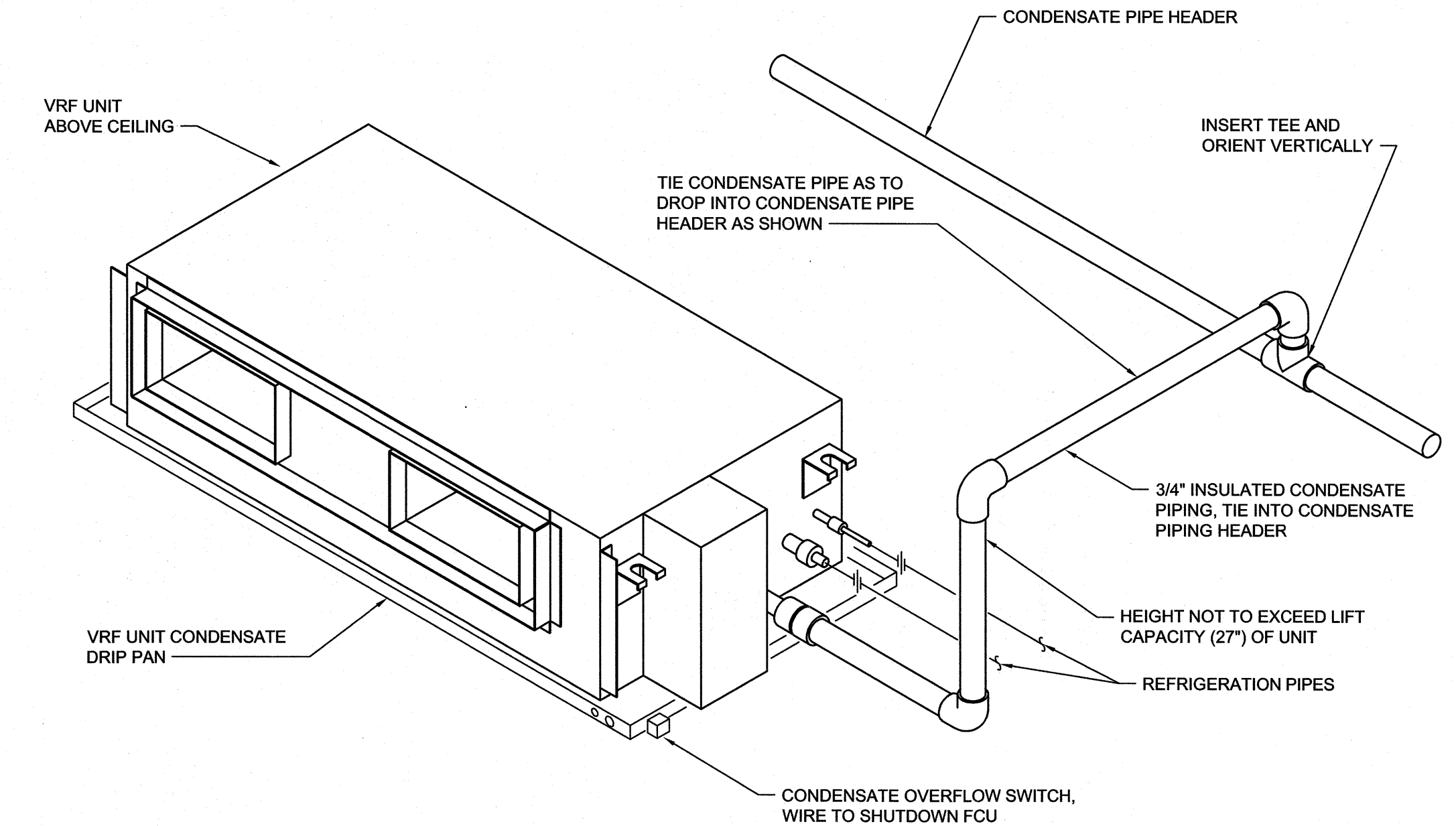
**6** DUCT SUPPORT DETAIL  
NOT TO SCALE



**7** RECTANGULAR DUCT FITTING DETAILS  
NOT TO SCALE



**8** DIFFUSER CONNECTION DETAIL  
NOT TO SCALE

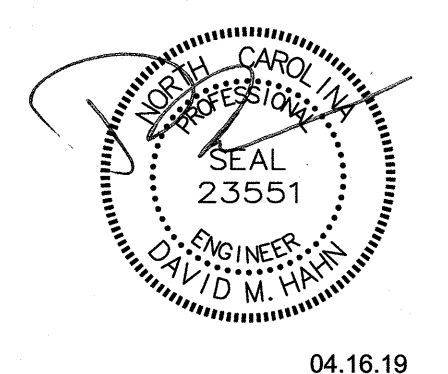


**9** TYPICAL AIR HANDLER DETAIL  
NOT TO SCALE

**BECKER MORGAN GROUP**  
ARCHITECTURE PLANNING  
Wilmington, NC  
3333 Jackle Drive, Suite 120  
Wilmington, NC 28403  
910.341.7600  
Salisbury, MD  
312 West Main St. Suite 300  
Salisbury, MD 21801  
410.546.9100  
Dover, DE  
309 S Governors Ave  
Dover, DE 19904  
302.734.7950  
www.beckermorgan.com

**ADAMS SOUTHEASTERN CONSTRUCTION**

**CBHF Engineers, PLLC**  
2246 Yaupon Drive Phone: 910.791.4000  
Wilmington, NC 28401 Fax: 910.791.5266  
www.cbhfindesign.com  
© Copyright 2019 NCB P-0506



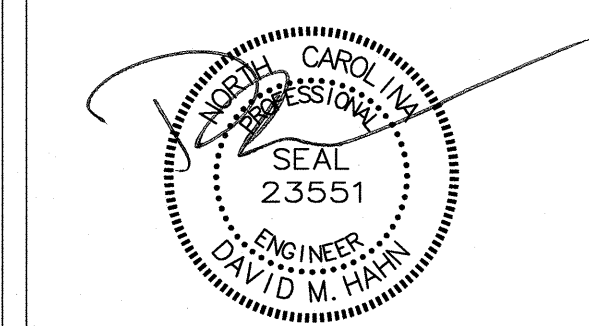
PROJECT TITLE  
**BRUNSWICK AMBULATORY SURGERY CENTER**  
LELAND, NC

SHEET TITLE  
**DETAILS**

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION
PROJECT NO: 2016248.01		
DATE: 10.26.2018		
SCALE: AS NOTED		
DRAWN BY: GRM PROJ MGR: DMH		

**M-501**  
COPYRIGHT © 2019





04.16.19

PROJECT TITLE

**BRUNSWICK  
AMBULATORY  
SURGERY CENTER  
LELAND, NC**

SHEET TITLE

**DETAILS**

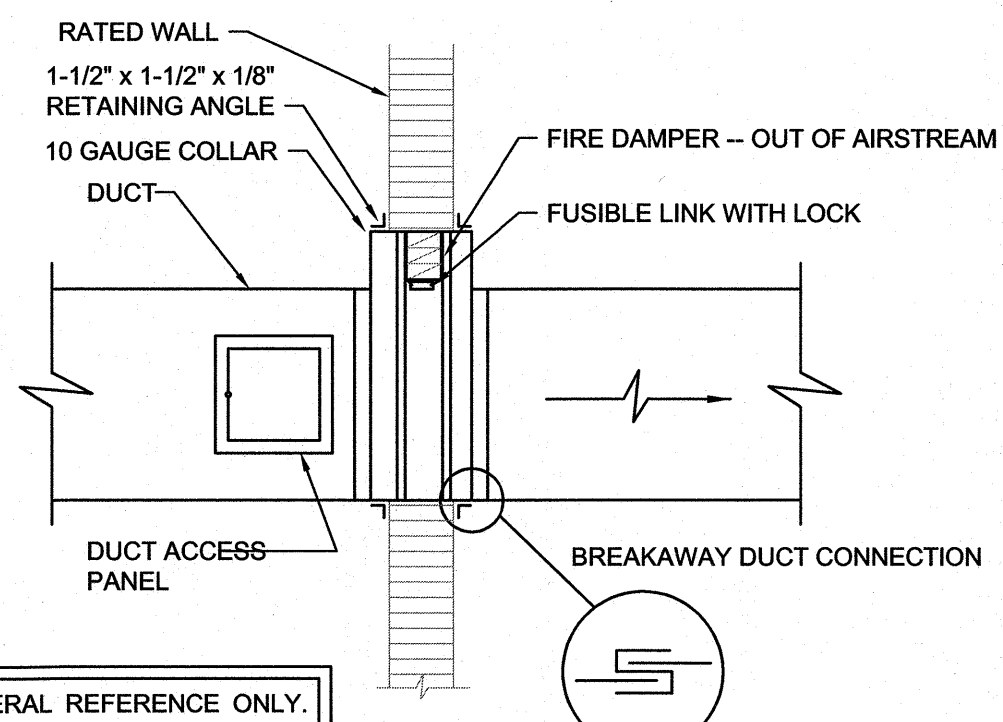
ISSUE BLOCK

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION

PROJECT NO:	2016248.01
DATE:	10.26.2018
SCALE:	AS NOTED
DRAWN BY:	GRM
PROJ MGR:	DMH

**M-502**

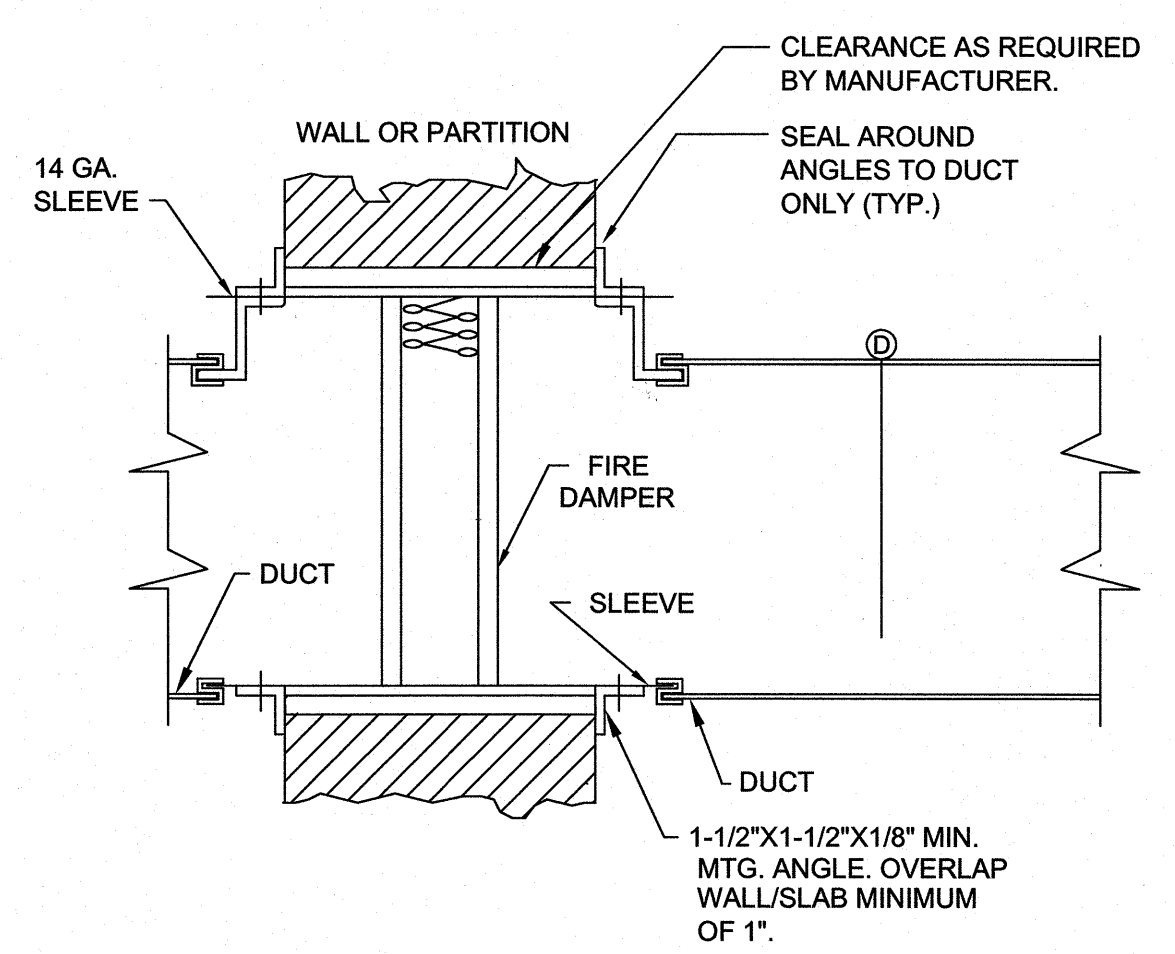
COPYRIGHT © 2019



NOTE: FOR GENERAL REFERENCE ONLY. INSTALL STRICTLY PER MANUFACTURERS INSTALLATION INSTRUCTIONS.

STEEL SLEEVE THICKNESS AS REQUIRED BY SMACNA "FIRE, SMOKE AND RADIATION DAMPER INSTALLATION GUIDE FOR HVAC SYSTEMS."

**1 FIRE DAMPER DETAIL**  
NOT TO SCALE



- NOTE:
1. PROVIDE FIRE DAMPERS IN ALL 1HR. THRU 4HR. WALLS, SLABS, AND PARTITIONS SHOWN ON ARCH. AND MECH. DRAWINGS.
  2. PROVIDE SMOKE DAMPERS IN ALL SHAFT ENCLOSURES SHOWN ON ARCH. AND MECH. DRAWINGS.
  3. PROVIDE DUCT ACCESS DOOR.
  4. PROVIDE ALL CEILING, FLOOR, AND WALL ACCESS DOORS NECESSARY FOR ACCESS TO FIRE DAMPER.
  5. SMOKE DAMPERS AND COMBINATION FIRE-SMOKE DAMPERS INSTALLED SIMILARLY.
  6. INSTALLATION SHALL COMPLY WITH SMACNA, NFPA-90A, SBC, UL555 AND LOCAL AUTHORITIES.
  7. BLANKET INSULATION SHALL BE INSTALLED OVER ANGLES AND SEALED TO WALL.
  8. DAMPER SHALL BE LOCATED OUT OF AIR STREAM.
  9. DUCT SMOKE DETECTOR SHALL BE INSTALLED WITHIN 5FT OF COMBINATION FIRE/SMOKE DAMPERS. DETECTOR SHALL BE FURNISHED BY FIRE ALARM CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.

**2 HORIZONTAL FIRE / SMOKE DAMPER DETAIL**  
NOT TO SCALE



**System No. W-L-2406**

**F Ratings — 1 and 2 Hr (See Item 1)**  
**T Ratings — 0, 1/2 and 3/4 Hr (See Item 2)**  
**L Rating At Ambient - 1.2 CFM/sq ft (See Item 3B)**  
**L Rating At 400 F - Less Than 1 CFM/sq ft (See Item 3B)**

**SECTION A-A**

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC.  
 B. Gypsum Board\* — One or two layers of nom 5/8 in. (16 mm) thick gypsum board, as specified in the individual Wall and Partition Design. See Table under Item 3B for max diam of opening.  
 2. Through-Penetrants — One nonmetallic pipe installed within the firestop system. See Table under Item 3B for annular space required in the firestop system. Pipe to be rigidly supported on both sides of wall assembly. The following types and sizes of nonmetallic pipes may be used:  
 A. Polyvinyl Chloride (PVC) Pipe — Nom 6 in. (152 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 6 in. (152 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping system.  
 C. Acrylonitrile Butadiene Styrene (ABS) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping system.  
 The T Rating for 2 hr fire-rated walls is 0 hr. The T Rating for 1 hr fire-rated walls is 3/4 hr for nom 1-1/2, 2 and 3 in. (38, 51 and 76 mm) diam through penetrants. The T Rating for 1 hr fire-rated walls is 1/2 hr for nom 4 and 6 in. (102 and 152 mm) diam through penetrants.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 26, 2015  
 Page: 1 of 2

**System No. W-L-2406**

**F Ratings — 1 and 2 Hr (See Item 1)**  
**T Ratings — 0, 1/2 and 3/4 Hr (See Item 2)**  
**L Rating At Ambient - 1.2 CFM/sq ft (See Item 3B)**  
**L Rating At 400 F - Less Than 1 CFM/sq ft (See Item 3B)**

**SECTION A-A**

3. Firestop System — The firestop system shall consist of the following:  
 A. Fill, Void or Cavity Material\* — Wrap Strip — See Table under Item 3B for min size of intumescent wrap strip. The wrap strip is continuously wrapped around the outer circumference of the pipe once and slid into the annular space such that approx 1/8 in. (3 mm) of the wrap strip protrudes from the wall surface. Wrap strip is held in place with integral fastening tape. Wrap strip installed on each surface of wall.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 648S - 1.5" US, CP 648S - 2" US, CP 648S - 3" US, CP 648S - 4" US and CP 648S - 6" US  
 B. Fill, Void or Cavity Material\* — Caulk — Min 1/4 in. (6 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. For 2 hr fire-rated walls, 1/4 in. (6 mm) bead fill material also applied at wrap strip/gypsum wall interface. In 1 hr fire-rated walls, fill material is optional for nom 1-1/2, 2, 3 and 4 in. (38, 51, 76 and 102 mm) diam penetrants. In 2 hr fire-rated walls, fill material is optional for nom 1-1/2, 2 and 3 in. (38, 51 and 76 mm) diam penetrants. Fill material is required to be used to attain L Ratings.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant

Nom Pipe Diam, in. (mm)	Wrap Strip	Wrap Strip Size, thick. X width, in. (mm)	Max Diam of Opening, in. (mm)	Annular Space, in. (mm)	
				Min	Max
1-1/2 (38)	CP 648S - 1.5" US	3/16 x 1 (5 x 25)	2-3/8 (60)	3/16 (5)	5/16 (8)
2 (51)	CP 648S - 2" US	3/16 x 1 (5 x 25)	3 (76)	3/16 (5)	5/16 (8)
3 (76)	CP 648S - 3" US	3/16 x 1-3/4 (5 x 44)	4 (102)	3/16 (5)	5/16 (8)
4 (102)	CP 648S - 4" US	3/8 x 1-3/4 (10 x 44)	5-3/8 (137)	3/8 (10)	1/2 (13)
6 (152)	CP 648S - 6" US	1/2 x 1-3/4 (13 x 44)	8 (203)	9/16 (14)	13/16 (21)

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 26, 2015  
 Page: 2 of 2

**System No. W-L-5028**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 0, 3/4 and 1 Hr (See Item 3)	FT Ratings — 0, 3/4 and 1 Hr (See Item 3)
L Rating At Ambient — Less Than 1 CFM/sq ft	FH Ratings — 1 and 2 Hr (See Item 1)
L Rating At 400 F — Less Than 1 CFM/sq ft	FTH Ratings — 0, 3/4 and 1 Hr (See Item 3)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft

**SECTION A-A**

1. Wall Assembly — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. (406 mm) OC. Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC.  
 B. Gypsum Board\* — 5/8 in. (16 mm) thick, 4 ft (122 mm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 7-1/2 in. (191 mm).  
 The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall assembly in which it is installed.  
 2. Through Penetrants — One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:  
 A. Steel Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.  
 B. Copper Tubing — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.  
 C. Copper Pipe — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 27, 2015  
 Page: 1 of 2

**System No. W-L-5028**

**SECTION A-A**

3. Tube Insulation — Plastics+ — Min 1/2 in. (13 mm) to max 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. An annular space of min 0 in. (point contact) to max 1-1/2 in. (38 mm) is required within the firestop system. The T, FT and FTH Ratings are 1 hr when the 1 in. (25 mm) thick tube insulation is used and 3/4 hr when the 3/4 in. (19 mm) thick tube insulation is used. When tube insulation thickness is less than 3/4 in. (19 mm), the T, FT and FTH Ratings are 0 hr.  
 See Plastics+ (OMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.  
 4. Fill, Void or Cavity Material\* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between pipe covering and gypsum board, a min 1/2 in. (13 mm) diam bead of fill material shall be applied at the pipe covering/gypsum board interface on both surfaces of wall.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant  
 \* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 27, 2015  
 Page: 2 of 2

**System No. W-L-5225**

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Rating — 1 or 2 Hr (See Item 1)	F Rating — 1 or 2 Hr (See Item 1)
T Rating — 0, 1, 1-1/2 or 2 Hr (See Item 3)	FT Rating — 0, 1, 1-1/2 or 2 Hr (See Item 3)
	FH Rating — 1 or 2 Hr (See Item 1)
	FTH Rating — 0, 1, 1-1/2 or 2 Hr (See Item 3)

**SECTION A-A**

System tested with a pressure differential of 2.5 Pa between the exposed and the unexposed surfaces with the higher pressure on the exposed side.  
 1. Wall Assembly — The fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:  
 A. Studs — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced 16 in. OC (406 mm). Steel studs to be min 2-1/2 in. (64 mm) wide and spaced max 24 in. (610 mm) OC.  
 B. Gypsum Board\* — Thickness, type and number of layers as specified in the individual Wall and Partition Design. Max diam of opening is 8-1/2 in. (178 mm).  
 The hourly F, FH Ratings of the firestop system are equal to the hourly assembly rating of the wall assembly in which it is installed.  
 2. Through Penetrants — One nonmetallic pipe or conduit to be centered within the firestop system. Pipe to be rigidly supported on both sides of wall. The following types and sizes of pipes may be used:  
 A. Polyvinyl Chloride (PVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) Schedule 40 cellular or solid core PVC pipe for use in closed (process or supply) or vented (drain, waste, or vent) piping systems.  
 B. Chlorinated Polyvinyl Chloride (CPVC) Pipe — Nom 4 in. (102 mm) diam (or smaller) SDR 13.5 CPVC pipe for use in closed (process or supply) piping systems.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 23, 2015  
 Page: 1 of 2

**System No. W-L-5225**

**SECTION A-A**

3. Pipe Covering\* — Plastics+ — Nom 1-1/2 in. (38 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m<sup>3</sup>) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. A nom annular space of min 0 in. (point contact) to max 1 in. (25 mm) is required within the firestop system.  
 See Pipe and Equipment Covering - Materials (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.  
 3A. Tube Insulation — Plastics+ — (Optional for pipes with nom diam of 2 in. (51 mm) or less) Max 1 in. (25 mm) thick acrylonitrile butadiene/polyvinyl chloride (AB/PVC) flexible foam furnished in the form of tubing. The annular space shall be min 1/8 in. to max 1/4 in. (3 to 6 mm).  
 See Plastics+ (OMFZ2) category in the Recognized Component Directory for names of manufacturers. Any Recognized Component tube insulation material meeting the above specifications and having a UL 94 Flammability Classification of 94-5VA may be used.  
 The hourly T, FT, FTH rating of the firestop system is equal to the hourly assembly rating of the wall assembly in which it is installed unless Item 3 is used and nom pipe size is less than 4 in. (102 mm). For openings with Item 3 glass fiber insulation and pipe sizes less than 4 in. (102 mm), when hourly rating of the wall assembly is 1 hr, the T, FT, FTH rating is 1 hr, and when the hourly rating is of the wall assembly is 2 hr, then the T, FT, FTH Rating is 1-1/2 hr. The T, FT, FTH Rating is 0 hr if Item 3A is less than 1 in. (25 mm) thick.  
 4. Firestop System — The firestop system shall consist of the following:  
 A. Fill, Void or Cavity Material\* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with both surfaces of wall.  
 HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE Sealant or FS-ONE MAX Intumescent Sealant  
 B. Fill, Void or Cavity Material\* — Wrap Strip — Nom 3/16 in. (5 mm) thick by 1-3/4 in. (44 mm) wide intumescent wrap strip. Layers individually wrapped around the through-penetrant with the ends butted and held in place with tape. Butted ends in successive layers shall be offset. Each wrap strip layer is to be installed flush with both surfaces of wall. Wrap strips are installed on each surface of the wall.

Product Designation	Max Pipe Size, in. (mm)	Number of Layers
CP648-E W25/1-3/4"	2 (51)	1
CP648-E W25/1-3/4"	4 (102)	3

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP-648E Wrap Strip  
 C. Steel Collar — Steel collar fabricated from coils of precut min 0.016 in. (0.4 mm) thick (No. 28 gauge) galv steel available from fill material manufacturer. Collar shall be nom 1-3/4 in. (44 mm) deep with 1 in. (25 mm) wide by 2 in. (51 mm) long anchor tabs on 1-3/4 in. (44 mm) centers for securement to both surfaces of wall. In addition, collars contain retainer tabs 1/2 in. (13 mm) wide by 3/16 in. (5 mm) long, located opposite the anchor tabs. Collar shall be lightly wrapped over the wrap strip, overlapping min 1 in. (25 mm) at seam and compressed with a min 0.028 in. (0.7 mm) thick stainless steel band at collar mid-height. The retainer tabs are folded 90 deg towards the pipe to maintain the annular space around the pipe and to retain the wrap strip. Each tab of collar secured to surface of wall by means of nom 1-1/4 in. (32 mm) long steel laminating drywall screws in conjunction with 1-1/4 in. (32 mm) diam steel fender washers.

\* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

**HILTI** Firestop Systems  
 Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc. January 23, 2015  
 Page: 2 of 2

**BECKER MORGAN GROUP**

ARCHITECTURE PLANNING  
 Wilmington, NC  
 3333 Jaeckle Drive, Suite 120  
 Wilmington, NC 28403  
 910.341.7600  
 Salisbury, MD  
 312 West Main St. Suite 300  
 Salisbury, MD 21801  
 410.546.9100  
 Dover, DE  
 309 S Governors Ave  
 Dover, DE 19904  
 302.734.7950  
 www.beckermorgan.com

**ADAMS SOUTHEASTERN CONSTRUCTION**

**CBHF Engineers, PLLC**

2246 Yaupon Drive Phone: 910.791.4000  
 Wilmington, NC 28401 Fax: 910.791.5266  
 www.cbhfindesigners.com  
 © Copyright 2019 NCB P-0506

04.16.19

PROJECT TITLE  
**BRUNSWICK AMBULATORY SURGERY CENTER**  
 LELAND, NC

SHEET TITLE  
**UL DETAILS**

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION
PROJECT NO:	2016248.01	
DATE:	10.26.2018	
SCALE:	AS NOTED	
DRAWN BY:	GRM	PROJ MGR: DMH

**M-503**  
 COPYRIGHT © 2019







**ELECTRIC STEAM HUMIDIFIER SCHEDULE**

DRAWING CODE	BASIS OF DESIGN MANUFACTURE	BASIS OF DESIGN MODEL	ALTERNATE APPROVED MANUFACTURERS	HUMIDIFICATION RATE - MAX (LBS/HR)	HUMIDIFICATION RATE - MIN (LBS/HR)	AIR TEMPERATURE BEFORE HUMIDIFICATION (DB°F/%RH)	NUMBER OF MANIFOLDS	MAKEUP WATER SUPPLY PRESSURE - MIN / MAX (PSIG)	ELECTRIC RESISTANCE HEATER CONTAINER		ELECTRICAL			WEIGHT (LBS)	NOTES	ACCESSORIES
									TOTAL POWER INPUT (KW)	NUMBER OF CYLINDERS	VOLTAGE (V/PH/Hz)	MCA (AMP)	MOP (AMP)			
HU01	CONDAIR	RS 130	CAREL USA-LLC, ARMSTRONG INTERNATIONAL, INC.	126.0	-	54.0 / 66.0	1	30 / 80	42.8	2	460/360	51.6	70.0	291	1-2	A-E

NOTES:  
 1. REFER TO SPECIFICATION SECTION 238413 - HUMIDIFIERS FOR ADDITIONAL INFORMATION.  
 2. HUMIDIFIER SHALL BE DESIGNED FOR INTERIOR INSTALLATION.

ACCESSORIES:  
 A. REMOTE FAULT INDICATION BOARD.  
 B. AIR PROVING SWITCH, DUCT, MTD..  
 C. DISTRIBUTION MANIFOLD.  
 D. STEAM TUBE, SAM-E, 48-IN.  
 E. FACTORY INSULATION ON DUCT-MOUNTED STEAM MANIFOLD.

**ELECTRIC HEATER SCHEDULE**

DRAWING CODE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL	LOCATION	DESCRIPTION	ELECTRIC COIL			SUPPLY AIR		FAN MOTOR		ELECTRICAL			WEIGHT (LBS)	MOUNTING HEIGHT (FT)	NOTES	ACCESSORIES	
					CAPACITY (KW)	STEPS	DISCHARGE	AIRFLOW (CFM)	THROW (FT)	SPEED (RPM)	MOTOR (HP)	POWER (V/PH/Hz)	FLA	MCA					MOCOP
EUH01	QMARK	CWH3180F	189 MEDICAL GAS	WALL HEATER	1.8	1	-	-	-	-	-	120/1/60	15.0	15.0	25	-	2.0	1	A,B
EUH02	QMARK	MUH05-81	137 MEDICAL EQUIPMENT	UNIT HEATER	5.0	1	350.0	12	1,600	1/100	480/3/60	6.0	6.0	15	27	8.0	2	C,D	

NOTES:  
 1. REFER TO SPECIFICATION SECTION 238239.19 - WALL UNIT HEATERS FOR ADDITIONAL INFORMATION.  
 2. REFER TO SPECIFICATION SECTION 238239.16 - PROPELLER UNIT HEATERS FOR ADDITIONAL INFORMATION.

ACCESSORIES:  
 A. SURFACE MOUNTING FRAME.  
 B. 14 GAUGE SECURITY FRONT COVER.  
 C. LOW VOLTAGE CONTROL TRANSFORMER AND CONTACTOR.  
 D. INTERNAL THERMOSTAT.

**ELECTRIC DUCT HEATER SCHEDULE**

DRAWING CODE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL	ALTERNATE APPROVED MANUFACTURERS	AREA SERVED	KW	HEATER DIMENSIONS		STEPS	AIR SIDE		ELECTRICAL			NOTES	ACCESSORIES
						HEIGHT (IN)	WIDTH (IN)		FLOW RATE (CFM)	STATIC PRESSURE DROP (IN. WG.)	VOLTAGE (V/PH/Hz)	MCA (AMPS)	MOCOP (AMPS)		
EDH01	DELL CORP.	M1-10x12-6-460-3-SCR	INDEECO, GREENHECK	STERILE CORRIDOR AREA	6.0	10.0	12.0	SCR	500	0.05	460/3/60	7.5	15	1,2,3	A-K
EDH02	DELL CORP.	M1-10x12-6-460-3-SCR	INDEECO, GREENHECK	121 CONTROL / OR SUPPORT AREA	6.0	10.0	12.0	SCR	500	0.05	460/3/60	7.5	15	1,2,3	A-K
EDH03	DELL CORP.	M1-14x28-18-460-3-SCR	INDEECO, GREENHECK	125 STORAGE	18.0	14.0	28.0	SCR	2,100	0.05	460/3/60	22.6	35	1,2,3	A-K
EDH04	DELL CORP.	M1-14x28-18-460-3-SCR	INDEECO, GREENHECK	126 PROCEDURE	18.0	14.0	28.0	SCR	2,100	0.05	460/3/60	22.6	35	1,2,3	A-K
EDH05	DELL CORP.	M1-12x12-7-460-3-SCR	INDEECO, GREENHECK	127 STERILIZATION	7.0	12.0	12.0	SCR	750	0.05	460/3/60	8.8	15	1,2,3	A-K
EDH06	DELL CORP.	M1-10x10-3-460-3-SCR	INDEECO, GREENHECK	128 DECONTAMINATION	3.0	10.0	10.0	SCR	250	0.05	460/3/60	3.8	15	1,2,3	A-K
EDH07	DELL CORP.	M1-14x28-18-460-3-SCR	INDEECO, GREENHECK	129 OPERATING ROOM	18.0	14.0	28.0	SCR	2,100	0.05	460/3/60	22.6	35	1,2,3	A-K
EDH08	DELL CORP.	M1-14x28-18-460-3-SCR	INDEECO, GREENHECK	130 PROCEDURE ROOM	18.0	14.0	28.0	SCR	2,100	0.05	460/3/60	22.6	35	1,2,3	A-K
EDH09	DELL CORP.	M1-12x24-14-460-3-SCR	INDEECO, GREENHECK	132 STERILE STORAGE	14.0	12.0	24.0	SCR	1,600	0.05	460/3/60	17.6	30	1,2,3	A-K

NOTES:  
 1. REFER TO SPECIFICATION SECTION 23 82 16.14 - ELECTRIC RESISTANCE AIR-COILS FOR ADDITIONAL INFORMATION.  
 2. OPEN COIL SLIP-IN DUCT SIZE.  
 3. POSITIVE PRESSURE SYSTEM.

ACCESSORIES:  
 A. SCR CONTROL WITH DUCT MOUNTED DISCHARGE AIR TEMPERATURE SENSOR.  
 B. CONTROL TRANSFORMER CLASS 2 - 24V.  
 C. DISCONNECTING CONTACTOR.  
 D. MAGNETIC CONTACTOR.  
 E. UNFUSED DOOR INTERLOCKING DISCONNECT.  
 F. 100% SCR CONTROLLER.  
 G. INSULATED CONTROL PANEL.  
 H. STAINLESS STEEL TERMINALS.  
 I. HINGED COVER.  
 J. AIRFLOW SWITCH.  
 K. UL LISTED.

**LOUVER SCHEDULE**

DRAWING CODE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL	TYPE	FRAME	DESCRIPTION	MATERIAL	LOUVER DEPTH (IN.)	SIZE (W x H) (IN.)	SERVICE	AIRFLOW (CFM)	PERFORMANCE RATINGS			NOTES	ACCESSORIES
											FREE AREA (SF)	S.P. LOSS (IN.H2O)	WATER PENETRATION (OZ./SF)		
L01	POTTORFF	ECD635	FIXED	BOX	HORIZONTAL, WIND-DRIVEN-RAIN-RESISTANT	ALUMINUM	6	16 x 16	EXHAUST	505	0.77	0.03	-	1,2,3	A,B
L02	POTTORFF	ECD635	FIXED	BOX	HORIZONTAL, WIND-DRIVEN-RAIN-RESISTANT	ALUMINUM	6	32 x 32	EXHAUST	2,300	3.79	0.05	-	1,2,3	A,B
L03	POTTORFF	ECD635	FIXED	BOX	HORIZONTAL, WIND-DRIVEN-RAIN-RESISTANT	ALUMINUM	6	16 x 16	INTAKE	400	0.77	0.04	-	1,2,3	A,B
L04	POTTORFF	ECD635	FIXED	BOX	HORIZONTAL, WIND-DRIVEN-RAIN-RESISTANT	ALUMINUM	6	16 x 16	EXHAUST	400	0.77	0.04	-	1,2,3	A,B

NOTES:  
 1. REFER TO SPECIFICATION SECTION 239119 - LOUVERS.  
 2. FINISH AS SELECTED BY ARCHITECT FROM MANUFACTURER'S FULL RANGE OF COLOR AND GLOSS.  
 3. MIAMI-DADE APPROVED.

ACCESSORIES:  
 A. DAMPER / ACTUATOR  
 B. BIRD SCREENING (MATERIAL TO MATCH LOUVER MATERIAL)

**DIFFUSERS, REGISTERS AND GRILLES SCHEDULE**

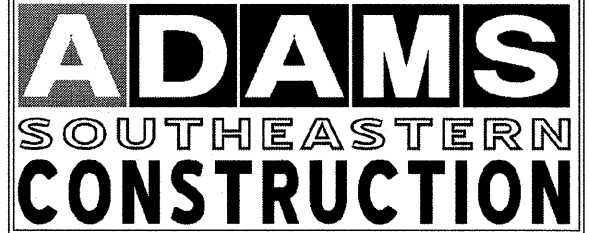
DRAWING CODE	BASIS OF DESIGN MANUFACTURER	BASIS OF DESIGN MODEL	ALTERNATE APPROVED MANUFACTURERS	TYPE	SERVICE	NECK SIZE (IN.)	MODULE SIZE (IN.)	MATERIAL	FINISH	MOUNTING	NOTES	ACCESSORIES
S2	METALAIRE	5750 AL	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	80	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	A,B
S3	METALAIRE	5750 AL	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	100	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	A,B
S4	METALAIRE	5750 AL	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	120	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	A,B
S5	METALAIRE	V4004	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	12 X 6	-	ALUMINUM	WHITE	T-BAR	1,2	A,B
S6	METALAIRE	PPL-AL	PRICE, TITUS	PERIFLOW PERIMETER UNIT	SUPPLY	24 X 8	-	ALUMINUM	WHITE	CEILING SURFACE	1,2	-
S7	METALAIRE	HPL-CL-AL-1	PRICE, TITUS	PERIFLOW LAMINAR FLOW DIFFUSER	SUPPLY	100	24 X 48	ALUMINUM	WHITE	CEILING SURFACE	1,2	B
S8	METALAIRE	V4004	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	6 X 6	-	ALUMINUM	WHITE	T-BAR	1,2	A,B
S9	METALAIRE	HPL-GS	PRICE, TITUS	SQUARE CEILING DIFFUSER	SUPPLY	100	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	A,B,D,E,F,G
R1	METALAIRE	RHF	PRICE, TITUS	FIXED FACE GRILLE	RETURN	20 X 20	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	C
R2	METALAIRE	RH	PRICE, TITUS	FIXED FACE GRILLE	RETURN	16 X 20	24 X 24	ALUMINUM	WHITE	WALL SURFACE	1,2	-
E1	METALAIRE	RH	PRICE, TITUS	FIXED FACE GRILLE	EXHAUST	20 X 20	24 X 24	ALUMINUM	WHITE	T-BAR	1,2	-
T1	METALAIRE	RH	PRICE, TITUS	FIXED FACE GRILLE	TRANSFER	20 X 20	-	ALUMINUM	WHITE	WALL SURFACE	1,2	-

NOTES:  
 1. REFER TO SPECIFICATION SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES FOR FURTHER INFORMATION.  
 2. DUCT BRANCH CONNECTION SIZE TO BE EQUAL TO THE NECK SIZE OF DIFFUSER UNLESS NOTED OTHERWISE ON PLANS.

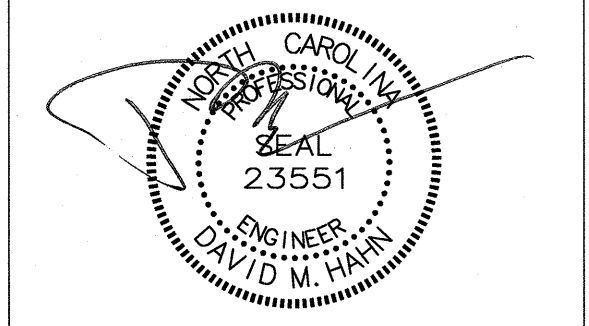
ACCESSORIES:  
 A. VOLUME DAMPER.  
 B. OPPOSED BLADE DAMPER.  
 C. 2" FILTER FRAME.  
 D. 23% FREE AREA.  
 E. ROUND TOP INLET.  
 F. HEPA FILTER.  
 G. 1.5 FOIL BACKED INSULATION.



ARCHITECTURE  
 PLANNING  
 Wilmington, NC  
 3333 Jacckle Drive, Suite 120  
 Wilmington, NC 28403  
 910.341.7600  
 Salisbury, MD  
 312 West Main St. Suite 300  
 Salisbury, MD 21801  
 410.546.9100  
 Dover, DE  
 309 S Governors Ave  
 Dover, DE 19904  
 302.734.7950  
 www.beckermorgan.com



2246 Yaupon Drive Phone: 910.791.4000  
 Wilmington, NC 28401 Fax: 910.791.5266  
 www.cbhfindesigners.com  
 © Copyright 2019 NCB P-0506



04.16.19

PROJECT TITLE  
**BRUNSWICK  
 AMBULATORY  
 SURGERY CENTER**  
 LELAND, NC

SHEET TITLE  
**SCHEDULES**

ISSUE BLOCK

0 04.16.19 ISSUED FOR CONSTRUCTION  
 MARK DATE DESCRIPTION  
 PROJECT NO: 2016248.01  
 DATE: 10.26.2018  
 SCALE: AS NOTED  
 DRAWN BY: GRM PROJ MGR: DMH

**M-602**  
 COPYRIGHT © 2019



**OR UNIT AIR CHANGE RATE SCHEDULE**

ROOM NAME	ROOM FUNCTION (NOTES 1 AND 2)	PRESSURE RELATIONSHIP TO ADJACENT SPACES	MINIMUM TOTAL AIR (CFM)	DESIGN TOTAL AIR (CFM)	MINIMUM OUTSIDE AIR (CFM)	ALL ROOM AIR EXHAUSTED TO OUTDOORS	ROOM AREA (SF)	CEILING HEIGHT (FT)	ROOM VOLUME (CF)	TOTAL AIR CHANGES (ACH)		OUTSIDE AIR CHANGES (ACH)	
										REQUIRED	DESIGN	REQUIRED	DESIGN
117 EQUIPMENT	CLEAN WORKROOM OR CLEAN HOLDING	+	70	140	35	NO	101.0	9.00	909	4.0	9.2	2.0	2.3
118 MEDS	PHARMACY	+	50	100	25	NO	79.0	9.00	711	4.0	8.4	2.0	2.1
121 CONTROL	CLEAN WORKROOM OR CLEAN HOLDING	+	40	80	20	NO	59.9	9.00	539	4.0	8.9	2.0	2.2
122 CORRIDOR	CORRIDOR	NR	260	260	65	NO	1,025.0	9.00	9,225	-	1.7	0.4	0.4
123/124 VESTIBULE / RO CLOSET	CORRIDOR	NR	40	40	10	NO	97.0	9.83	954	-	2.5	0.6	0.6
125 STORAGE	CLEAN WORKROOM OR CLEAN HOLDING	+	330	660	165	NO	489.7	10.00	4,897	4.0	8.1	2.0	2.0
126 PROCEDURE	PROCEDURE ROOM (CLASS A SURGERY)	+	1,250	1,250	245	NO	487.7	10.00	4,877	15.0	15.4	3.0	3.8
127 STERILIZATION	STERILIZER EQUIPMENT ROOM	-	670	670	170	YES	405.4	9.83	3,986	10.0	10.1	0.0	2.6
128 DECONTAMINATION	DECONTAMINATION	-	180	180	60	YES	177.2	9.83	1,742	6.0	6.2	2.0	2.1
129 OPERATING ROOM	OPERATING ROOM (CLASS B AND CLASS C)	+	2,050	2,050	325	NO	485.9	10.00	4,859	25.0	25.3	4.0	6.3
130 PROCEDURE	PROCEDURE ROOM (CLASS A SURGERY)	+	1,250	1,250	245	NO	485.9	10.00	4,859	15.0	15.4	3.0	3.9
131 CORRIDOR	CORRIDOR	NR	80	80	20	NO	306.5	9.00	2,759	-	1.7	2.0	0.4
132 STERILE STORAGE	CLEAN WORKROOM OR CLEAN HOLDING	+	790	1,580	395	NO	1,163.0	10.18	11,843	4.0	8.0	2.0	2.0
169 EQUIPMENT	CLEAN WORKROOM OR CLEAN HOLDING	+	80	160	40	NO	124.5	9.00	1,120	4.0	8.6	2.0	2.1

NOTES:  
 1. ROOM FUNCTION FOR NON-CORRIDOR SPACES DEFINED USING SUBCHAPTER 13C AND ASHRAE STANDARD 170-2013.  
 2. CORRIDOR VENTILATION RATES DEFINED USING 2012 NC MECHANICAL CODE.

**VRF SYSTEM AIR CHANGE RATE SCHEDULE**

ROOM NAME	ROOM FUNCTION (NOTE 1)	MINIMUM SA (CFM)	MINIMUM OA (CFM)	PRESSURE RELATIONSHIP TO ADJACENT SPACES	ROOM AREA (SF)	CEILING HEIGHT (FT)	ROOM VOLUME (CF)	SUPPLY AIR CHANGES (ACH)		OUTSIDE AIR CHANGES (ACH)	
								REQUIRED	DESIGN	REQUIRED	DESIGN
152 POST-OP 1	EXAMINATION ROOM	85	30	+/-	83.0	9.83	816	6.0	6.25	2.0	2.21
153 POST-OP 2	EXAMINATION ROOM	85	30	+/-	83.0	9.83	816	6.0	6.25	2.0	2.21
157 RECOVERY	RECOVERY ROOM	140	50	NR	140.0	9.83	1,377	6.0	6.10	2.0	2.18
158 CLEAN UTILITY	CLEAN HOLDING	55	30	+	79.0	9.83	777	4.0	4.25	2.0	2.32
159 NUTRITION	FOOD PREPARATION CENTER	60	15	NR	36.0	9.83	354	10.0	10.17	2.0	2.54
162 PRE-OP 1	EXAMINATION ROOM	85	30	+/-	84.0	9.83	826	6.0	6.17	2.0	2.18
163 PRE-OP 2	EXAMINATION ROOM	85	30	+/-	84.0	9.83	826	6.0	6.17	2.0	2.18
165 PRE-OP 3	EXAMINATION ROOM	85	30	+/-	84.0	9.83	826	6.0	6.17	2.0	2.18
166 PRE-OP 4	EXAMINATION ROOM	85	30	+/-	84.0	9.83	826	6.0	6.17	2.0	2.18
167 PRE-OP 5	EXAMINATION ROOM	85	30	+/-	84.0	9.83	826	6.0	6.17	2.0	2.18
173 N PRE-TEST	EXAMINATION ROOM	125	45	+/-	124.0	9.83	1,219	6.0	6.15	2.0	2.21
178 RECOVERY	RECOVERY ROOM	100	35	+/-	101	9.83	993	6.0	6.04	2.0	2.11
180 POST-OP PT	RECOVERY ROOM	75	25	+/-	57	13.00	741	6.0	6.07	2.0	2.02
181 POST-OP 3	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05
182 POST-OP 4	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05
183 POST-OP 5	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05
184 POST-OP 6	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05
185 POST-OP 7	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05
188 POST-OP 8	RECOVERY ROOM	120	40	+/-	90	13.00	1,170	6.0	6.15	2.0	2.05

NOTES:  
 1. ROOM FUNCTION DEFINED USING SUBCHAPTER 13C AND ASHRAE STANDARD 170-2013.

**EXHAUST RATE SCHEDULE**

ROOM NAME	ROOM FUNCTION	EXHAUST AIRFLOW (CFM)	PRESSURE (+/-)	ALL ROOM AIR EXHAUSTED TO OUTSIDE	ROOM AREA (SF)	CEILING HEIGHT (FT)	ROOM VOLUME (CF)	EXHAUST AIR CHANGES	
								REQUIRED	DESIGN
109 TOILET	BATHROOM	105	-	YES	67.3	9.00	606	10.0	10.4
112 TOILET	BATHROOM	90	-	YES	60.0	9.00	540	10.0	10.0
127 STERILIZATION	STERILIZER EQUIPMENT ROOM	800	-	YES	405.4	10.00	4,054	10.0	11.8
128 DECONTAMINATION	SOILED OR DECONTAMINATION ROOM	300	-	YES	177.2	10.00	1,772	6.0	10.2
133 TRASH	LINEN AND TRASH CHUTE ROOM	85	-	YES	51.2	9.83	503	10.0	10.1
134 SOIL/BIOHAZARD	SOILED LINEN SORTED AND STORAGE	300	-	YES	180.4	9.83	1,774	10.0	10.1
135 TOILET	BATHROOM	95	-	YES	63.0	9.00	567	10.0	10.1
143 SHOWER	BATHROOM	130	-	YES	86.4	9.00	778	10.0	10.0
146 SHOWER	BATHROOM	130	-	YES	86.4	9.00	778	10.0	10.0
151 SOILED UTILITY	SOILED LINEN SORTED AND STORAGE	85	-	YES	51.2	9.83	503	10.0	10.1
154 JANITOR	JANITOR'S CLOSET	110	-	YES	71.0	9.00	639	10.0	10.3
155 TOILET	BATHROOM	110	-	YES	72.0	9.00	648	10.0	10.2
168 JANITOR	JANITOR'S CLOSET	115	-	YES	73.7	9.00	663	10.0	10.4
175 TOILET	BATHROOM	100	-	YES	66.6	9.00	599	10.0	10.0
176 TOILET	BATHROOM	100	-	YES	66.6	9.00	599	10.0	10.0

NOTES:  
 1. ROOM FUNCTION DEFINED USING SUBCHAPTER 13C AND ASHRAE STANDARD 170-2013.

**EXHAUST RATE SCHEDULE**

ROOM NAME	GOVERNING CODE/STANDARD	ROOM FUNCTION	PRESSURE (+/-)	ALL ROOM AIR EXHAUSTED TO OUTSIDE	EXHAUST RATE (CFM/SF)	ROOM AREA (SF)	CEILING HEIGHT (FT)	ROOM VOLUME (CF)	EXHAUST RATE (CFM)	
									REQUIRED	DESIGN
137 MEDICAL EQUIPMENT	2012 NC MECHANICAL CODE	EQUIPMENT ROOM	NR	YES	0.06	146	16.00	2,331	9	400
142 WOMENS LOCKER	2012 NC MECHANICAL CODE	LOCKER / DRESSING ROOMS	-	YES	0.25	110	9.00	986	27	50
145 MENS LOCKER	2012 NC MECHANICAL CODE	LOCKER / DRESSING ROOMS	-	YES	0.25	142	9.00	1,280	36	50

**VENTILATION SUMMARY**

SPACE NAMES	MULT	SPACE FLOOR AREA (A2) (Sq Ft)	OUTDOOR AIR RATE (CFM/Sq Ft) (Ra)	TIME AVERAGED OCCUPANCY (people) (Pz)	PEOPLE OUTDOOR AIR RATE (CFM/person) (Rp)	BREATHING ZONE OUTDOOR AIR (Vbz)	AIR DISTRIBUTION EFFECTIVENESS (Ez)	REQUIRED SPACE OUTDOOR AIR (CFM) (Voz)	DESIGN SPACE OUTDOOR AIR (CFM) (Voz)
108 ASC WAITING	1	611	0.06	21	5	142	0.8	177	180
110 RECEPTION	1	464	0.06	6	5	58	0.8	72	75
111 WORKROOM	1	464	0.06	6	5	58	0.8	72	75
113 BREAKROOM	1	362	0.06	4	5	42	0.8	52	55
114 CORRIDOR	1	85	0.06	0	0	5	0.8	6	10
115 CONSULTATION	1	88	0.06	2	5	15	0.8	19	20
116 CONSULTATION	1	88	0.06	2	5	15	0.8	19	20
119 SPARE	1	57	0.06	1	5	8	0.8	11	15
120 NURSE MANAGER OFFICE	1	102	0.06	1	5	11	0.8	14	15
121 CONTROL	1	60	0.06	1	5	9	0.8	11	15
136 CONFERENCE	1	139.1	0.06	2	5	18	0.8	23	25
138 RECEIVING	1	133	0.06	0	0	8	0.8	10	10
139 CORRIDOR	1	133.6	0.06	0	0	8	0.8	10	10
140 STORAGE	1	31	0.12	0	0	4	0.8	5	5
141 VESTIBULE	1	62	0.06	0	0	4	0.8	5	5
144 VESTIBULE	1	44	0.06	0	0	3	0.8	3	5
147 CORRIDOR	1	167	0.06	0	0	10	0.8	12	15
148 BULK STORAGE	1	420	0.06	1	5	30	0.8	38	40
149 CORRIDOR	1	118	0.06	0	0	7	0.8	9	10
150 CORRIDOR	1	146	0.06	0	0	9	0.8	11	15
156 CORRIDOR	1	223	0.06	0	0	13	0.8	17	20
160 NURSE	1	354	0.06	6	5	51	0.8	64	65
161 CORRIDOR	1	462	0.06	0	0	28	0.8	35	35
164 CORRIDOR	1	113	0.06	0	0	7	0.8	8	10
169 EQUIPMENT	1	132	0.06	0	5	8	0.8	10	10
170 CORRIDOR	1	107	0.06	0	0	6	0.8	8	10
171 CORRIDOR	1	290	0.06	0	0	17	0.8	22	25
172 ADMINISTRATION	1	129	0.06	2	5	18	0.8	22	25
174 CORRIDOR	1	206	0.06	0	0	12	0.8	15	20
177 EQUIPMENT	1	79	0.06	0	5	5	0.8	6	10
179 CORRIDOR	1	711	0.06	0	0	43	0.8	53	55
187 STORAGE	1	71	0.06	0	5	4	0.8	5	10
188 CORRIDOR	1	84	0.06	0	0	5	0.8	6	10

NOTES:  
 1. VENTILATION RATES DEFINED USING 2012 NC MECHANICAL CODE.



ARCHITECTURE  
PLANNING

Wilmington, NC

3333 Jaeckle Drive, Suite 120  
Wilmington, NC 28403

910.341.7600

Salisbury, MD

312 West Main St. Suite 300  
Salisbury, MD 21801

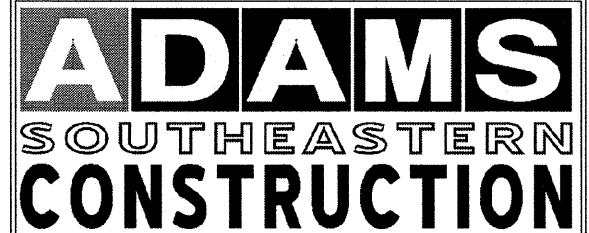
410.546.9100

Dover, DE

309 S Governors Ave  
Dover, DE 19904

302.734.7950

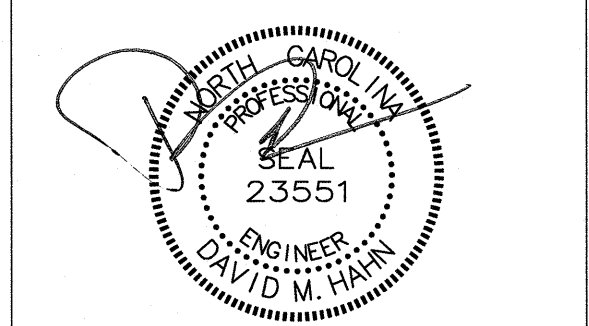
www.beckermorgan.com



2246 Yaupon Drive Phone: 910.791.4000  
Wilmington, NC 28401 Fax: 910.791.5266

www.cbhfengineers.com

© Copyright 2019 NCB P-0506



04.16.19

PROJECT TITLE

**BRUNSWICK  
AMBULATORY  
SURGERY CENTER  
LELAND, NC**

SHEET TITLE

**SCHEDULES**

ISSUE BLOCK

0 04.16.19 ISSUED FOR CONSTRUCTION

MARK DATE DESCRIPTION

PROJECT NO: 2016248.01

DATE: 10.26.2018

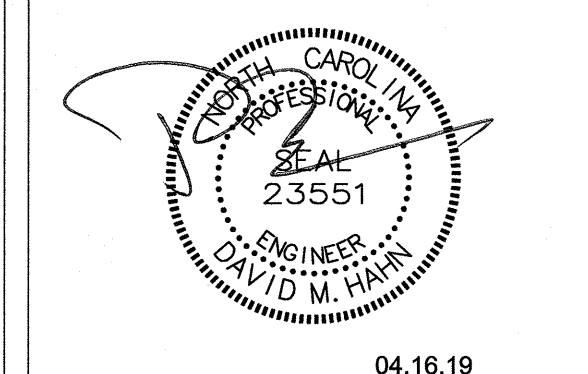
SCALE: AS NOTED

DRAWN BY: GRM PROJ MGR: DMH

**M-603**

COPYRIGHT © 2019





PROJECT TITLE  
**BRUNSWICK AMBULATORY SURGERY CENTER**  
 LELAND, NC

SHEET TITLE  
**VRF SCHEMATIC**

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION
PROJECT NO: 2016248.01		
DATE: 10.26.2018		
SCALE: AS NOTED		
DRAWN BY: GRM		PROJ MGR: DMH

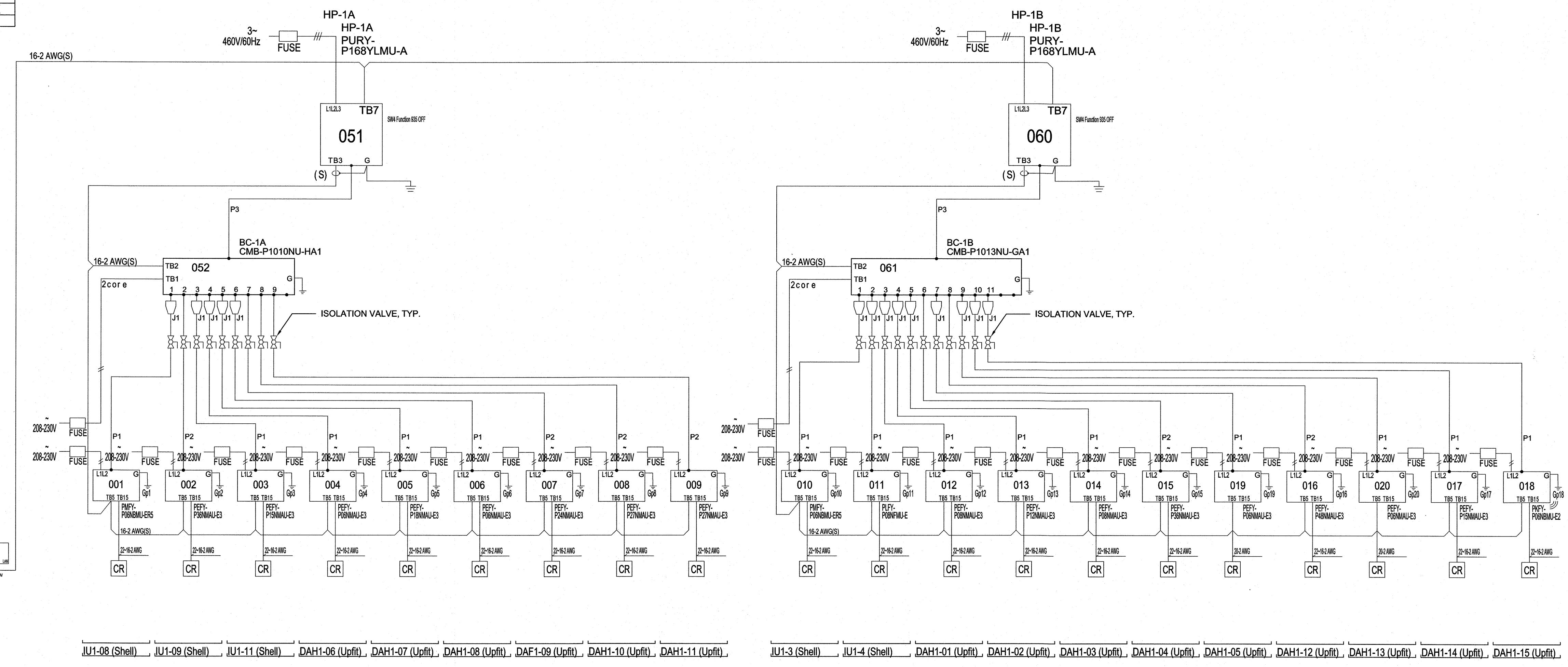
**M-604**  
 COPYRIGHT © 2019

**CITY MULTI SYSTEM SCHEMATIC DWG.**

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.  
 $1.25mm(\frac{5}{16} AWG) : 1.25mm(1/8 AWG)$  or more.  $0.75mm(\frac{3}{16} AWG) : \text{between } 0.5mm(\frac{1}{4} AWG) \text{ and } 0.75mm(\frac{3}{16} AWG)$

DIAGRAM SYMBOL LEGEND	CONT.No	PAGE
—#—		
—		
—		
—		

PIPING AND CONTROLS
SYMBOL BRANCH PIPE MODEL NAME
J1 Reducer
SYMBOL LIQUID PIPE/GAS PIPE SIZE
P1 1/4 1/2
P2 3/8 1/2
P3 7/8 1-1/8
SYMBOL MODEL NUMBER
ME PAR-V1MEDUX
CR PAC-YT302RAL1



**1 VRF SCHEMATIC**  
 NOT TO SCALE

**NOTE:**  
 PIPING LENGTHS NOT SHOWN ON THESE DIAGRAMS. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR DETERMINING PIPING LENGTHS USING MOST DIRECT ROUTING WHILE MAINTAINING ACCEPTABLE CONCEALMENT. PIPE ROUTING SHALL BE APPROVED BY GENERAL CONTRACTOR, ARCHITECT AND ENGINEER.



PAC01 / HU01 / EDH0#

RUN CONDITIONS - SCHEDULED:  
PAC01 SHALL RUN BASED UPON AN OPERATOR ADJUSTABLE SCHEDULE.

EMERGENCY SHUTDOWN:  
PAC01 SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING AN EMERGENCY SHUTDOWN SIGNAL.

SMOKE DETECTION:  
PAC01 SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS.

PAC01 OUTSIDE AIR DAMPER:  
THE OUTSIDE AIR DAMPER SHALL OPEN ANYTIME THE UNIT RUNS AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE SUPPLY FAN SHALL START ONLY AFTER THE DAMPER STATUS HAS PROVEN THE DAMPER IS OPEN.

PAC01 SUPPLY FAN:  
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.

PAC01 SUPPLY AIR TEMPERATURE SETPOINT - FIXED:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL MAINTAIN A FIXED SUPPLY AIR TEMPERATURE SETPOINT OF 52°F (ADJ.).

COOLING STAGES:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:  
• THE SUPPLY AIR TEMPERATURE IS ABOVE COOLING SETPOINT.  
PAC01  
• AND THE FAN STATUS IS ON.

PAC01 MINIMUM OUTSIDE AIR VENTILATION:

WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE OUTSIDE AIRFLOW AND MODULATE THE OUTSIDE AIR DAMPERS TO MAINTAIN THE PROPER MINIMUM OUTSIDE AIR VENTILATION. OVERRIDING NORMAL DAMPER CONTROL. ON DROPPING OUTSIDE AIRFLOW, THE CONTROLLER SHALL MODULATE THE OUTSIDE AIR DAMPERS OPEN TO MAINTAIN THE OUTSIDE AIRFLOW SETPOINT (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH OUTSIDE AIR VENTILATION: IF THE OUTSIDE AIR VENTILATION IS GREATER THAN 35% (ADJ.) THAN SCHEDULED.  
• LOW OUTSIDE AIR VENTILATION: IF THE OUTSIDE AIR VENTILATION IS LOWER THAN 35% (ADJ.) THAN SCHEDULED.

PAC01 SUPPLY AIRFLOW:  
THE CONTROLLER SHALL MEASURE THE SUPPLY AIRFLOW.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH SUPPLY AIRFLOW: IF SUPPLY AIRFLOW IS GREATER THAN 20% (ADJ.) THAN SCHEDULED.  
• LOW SUPPLY AIRFLOW: IF SUPPLY AIRFLOW IS LOWER THAN 20% (ADJ.) THAN SCHEDULED.

HU01 HUMIDIFIER CONTROL (BACNET INTERFACE):  
THE CONTROLLER SHALL MEASURE THE SUPPLY DEWPOINT AND MODULATE THE HUMIDIFIER TO MAINTAIN A SETPOINT OF 48F (ADJ.). THE HUMIDIFIER SHALL BE ENABLED WHENEVER THE SUPPLY FAN STATUS IS ON.

THE HUMIDIFIER SHALL TURN OFF WHENEVER:  
• THE RELATIVE HUMIDITY IN THE SUPPLY DUCT EXCEEDS 95%RH AS MEASURED BY A SECONDARY MODULATING HIGH LIMIT SAFETY SENSOR.  
• OR ON LOSS OF SUPPLY FAN STATUS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH SUPPLY AIR DEWPOINT: IF THE SUPPLY AIR DEWPOINT IS GREATER THAN 55F (ADJ.).  
• LOW SUPPLY AIR DEWPOINT: IF THE SUPPLY AIR DEWPOINT IS LESS THAN 45F (ADJ.).

PAC01 EVAPORATOR AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE EVAPORATOR AIR TEMPERATURE.

PAC01 PREFILTER DIFFERENTIAL PRESSURE MONITOR:  
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE PREFILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• PREFILTER CHANGE REQUIRED: PREFILTER DIFFERENTIAL PRESSURE EXCEEDS UNIT MANUFACTURERS PRE-DEFINED LIMIT.

PAC01 FINAL FILTER DIFFERENTIAL PRESSURE MONITOR:  
THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FINAL FILTER.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• FINAL FILTER CHANGE REQUIRED: FINAL FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJ.).

PAC01 SUPPLY AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 80°F (ADJ.).  
• LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

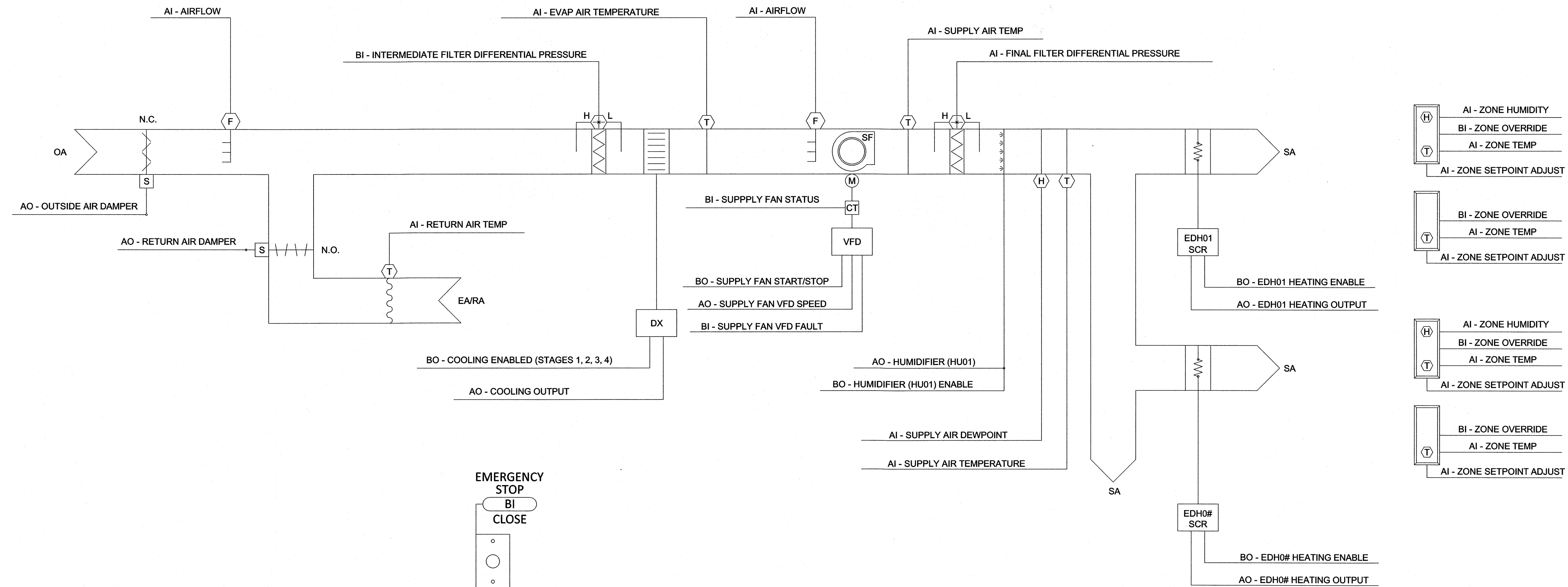
EDH0# REHEATING DUCT HEATERS:  
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND MODULATE THE REHEATING COIL ON DROPPING TEMPERATURE TO MAINTAIN ITS HEATING SETPOINT.

EDH0# REHEATING DUCT HEATERS DISCHARGE AIR TEMPERATURE:  
THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).  
• LOW DISCHARGE AIR TEMP: IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 40°F (ADJ.).

EDH0# ZONE HUMIDITY:  
THE CONTROLLER SHALL MONITOR THE ZONE HUMIDITY.

ALARMS SHALL BE PROVIDED AS FOLLOWS:  
• HIGH ZONE HUMIDITY: IF THE ZONE HUMIDITY IS GREATER THAN 70% (ADJ.).  
• LOW ZONE HUMIDITY: IF THE ZONE HUMIDITY IS LESS THAN 40% (ADJ.).



1 PAC01 / HU01 / EDH0# SEQUENCE OF OPERATION AND CONTROL DIAGRAM  
NOT TO SCALE

**BECKER MORGAN GROUP**  
ARCHITECTURE PLANNING  
Wilmington, NC  
3333 Jaeckle Drive, Suite 120  
Wilmington, NC 28403  
910.341.7600  
Salisbury, MD  
312 West Main St. Suite 300  
Salisbury, MD 21801  
410.546.9100  
Dover, DE  
309 S Governors Ave  
Dover, DE 19904  
302.734.7950  
www.beckermorgan.com

**ADAMS SOUTHEASTERN CONSTRUCTION**

**CBHF Engineers, PLLC**  
2246 Yaupon Drive Phone: 910.791.4000  
Wilmington, NC 28401 Fax: 910.791.5266  
© Copyright 2019 www.cbhfenr.com  
NC# P-9596

Professional Engineer Seal  
DAVID M. HARRIS  
04.16.19

BRUNSWICK AMBULATORY SURGERY CENTER  
LELAND, NC

CONTROLS

MARK	DATE	DESCRIPTION
0	04.16.19	ISSUED FOR CONSTRUCTION
PROJECT NO:		2016248.01
DATE:		10.26.2018
SCALE:		AS NOTED
DRAWN BY: GRM		PROJ MGR: DMH
<b>M-605</b>		
COPYRIGHT © 2019		