three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot

11/25/2016 12:00:57 PM

GENERAL MECHANICAL NOTES

1 THE DRAWINGS SHOW THE GENERAL ARRANGEMENT AND LOCATION OF EQUIPMENT, DUCTWORK, PIPING, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE MECHANICAL INSTALLATION W/ THE STRUCTURE AND OTHER TRADES AND SHALL PROVIDE ADDITIONAL OFFSETS AND FITTINGS AS NECESSARY.

2 COORDINATE WORK WITH AUTHORITY HAVING JURISDICTION AND OBTAIN ALL PERMITS AND INSPECTIONS.

3 THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS SHALL COMPLY WITH THE 2012 EDITION OF THE INTERNATIONAL MECHANICAL CODE, NFPA 90A, LOCAL CODE AND ALL CODES HAVING JURISDICTION. IN THE EVENT OF A CONFLICT BETWEEN CODES, THE MOST STRINGENT SHALL ALWAYS GOVERN.

4 DUCT DIMENSIONS ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS

5 THE CONTRACTOR SHALL CHECK AND VERIFY ALL CLEARANCES PRIOR TO FABRICATION OR INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING SYSTEMS. WHERE CONDITIONS REQUIRE A CHANGE IN DUCT OR PIPE ROUTING, NOTIFY THE COR FOR AN ACCEPTABLE ALTERNATIVE METHOD. AVOID ROUTING DUCTWORK DIRECTLY OVER LIGHT FIXTURES, DIFFUSERS, AND OTHER CEILING MTD. DEVICES. LOCATE ALL MECHANICAL EQUIPMENT SO THAT FILTERS AND COMPONENTS REQUIRING ACCESS (SERVICE AND MAINTENANCE) ARE FULLY ACCESSIBLE.

6 PROVIDE CURVED RADIUS ELBOW AT FIRST SUPPLY (RETURN FITTING FOR ALL HVAC UNITS. PROVIDE TURNING VANES IN ALL 90 DEGREE ELBOWS IN ALL RECTANGULAR SUPPLY/RETURN/EXHAUST DUCT SYSTEMS. ANY OFFSETS REQUIRED IN DUCT SYSTEMS SHALL BE INSTALLED PER SMACNA STANDARDS. SHARP ANGLED TRANSITIONS OR OFFSETS (WILL NOT BE ALLOWED). PROVIDE DUCT ACCESS DOORS AT LOCATIONS SPECIFIED.

7 INSTALL ALL DUCT MOUNTED DEVICES (DAMPERS, ACCESS DOORS, ETC.) AND PIPING SPECIALTIES IN EASILY ACCESSIBLE LOCATIONS. ADVISE THE COR IN ADVANCE OF INSTALLATION IF ACCESS WILL BE HINDERED SO AN ALTERNATE LOCATION CAN BE SELECTED.

8 ALL DUCT TAKE-OFFS SHALL BE INSTALLED AS SHOWN BY DETAILS ON THE PLANS WITH A MANUAL BALANCE DAMPER AT EVERY TAKE-OFF. WHERE DUCT RUN-OUT SIZE IS NOT SHOWN PROVIDE DUCT SAME SIZE AS GRILLE NECK SIZE. PRE-INSULATED FLEXIBLE DUCT MAY BE USED FOR FINAL CONNECTION TO SUPPLY/RETURN GRILLES (MAX. LENGTH 5).

9 ALL ROTATING MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH VIBRATION ISOLATION. PROVIDE FLEXIBLE NEOPRENE DUCT CONNECTORS BETWEEN DUCTWORK AND ISOLATED MECHANICAL EQUIPMENT.

10 THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF FIRE RATED WALLS/FLOORS/CEILINGS BY DUCTWORK, PIPING, ETC., WITH U.L. LISTED FIRE STOPPING MATERIAL TO MAINTAIN FIRE RATING OF THE BARRIER.

11 SEISMIC PROTECTION OF EQUIPMENT, DUCTWORK, PIPING AND UTILITIES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 16 OF THE 2012 EDITION OF THE INTERNATIONAL BUILDING CODE. ALL SEISMIC RESTRAINT AND BRACING SHALL BE SUBSTANTIATED BY MANUFACTURER'S SUBMITTALS AND PE APPROVED PER THE SPECIFICATIONS.

12 BALANCE ALL AIR DISTRIBUTION DEVICES, EXHAUST FANS, AND OUTSIDE AIR QUANTITIES AS SCHEDULED OR SHOWN ON THE DRAWINGS. PROVIDE MARKERS AT ALL DAMPER LOCATIONS SHOWING FULL OPEN/CLOSED POSITIONS AND DAMPER SETTING FOR REQUIRED AIRFLOW. PROVIDE FINAL TEST AND BALANCE REPORT ALONG W/ SCHEMATIC DRAWINGS SHOWING DIFFUSER LOCATION W/ DESIGN AND ACTUAL CFM. THE DIFFUSER TAGS ON THE DRAWINGS SHALL CORRESPOND TO THE DIFFUSER TAGS ON THE REPORT. THIS REPORT SHALL BE SUBMITTED BEFORE THE FINAL INSPECTION IS PERFORMED. SEE THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

13 THE SYSTEMS SERVING THE RENOVATION AREA ARE CRITICAL FOR THE HOSPITAL. THESE FACILITIES MUST REMAIN OPERATIONAL THROUGHOUT THE CONSTRUCTION CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY SYSTEM SHUTDOWNS WITH CONTRACTING OFFICER AT LEAST 30 DAYS IN ADVANCE.

14 THE BUILDING WILL BE OCCUPIED AND WILL BE IN OPERATION DURING THE LIFE OF THE CONTRACT. THE CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES AS REQUIRED TO MAINTAIN SYSTEMS (INCLUDING BUT NOT LIMITED TO FIRE DETECTION/ALARM, CONTROL SYSTEMS, LIFE SAFETY, AND FIRE PROTECTION. THE CONTRACTOR SHALL PROTECT ALL SYSTEMS OR PORTION OF SYSTMES TO REMAIN FOR REUSE FROM DAMAGE. ALL SYSTEMS SHALL BE TESTED IN SERVICE AFTER COMPLETION OF THE CONTRACT AND MADE COMPLETE AND OPERATIONAL AT NO ADDITIONAL COST TO THE GOVERMENT.

GENERAL DEMOLITION NOTES

1 ALL DUCTWORK, EQUIPMENT, AND PIPING SHOWN WITH DASHED AND DARK LINES INDICATE ITEMS TO BE DEMOLISHED. ALL EXISTING TO REMAIN IS INDICATED AS LIGHT AND DASHED LINES. SEE ARCHITECTURAL DRAWINGS AND CODED DEMOLITION NOTES FOR SPECIFIC INFORMATION. EXISTING DUCT TAKE-OFFS MAY BE REUSED IN NEW WORK IF CORRECT SIZE AND LOCATION. ALL EXISTING DUCTWORK TO BE REUSED SHALL BE COMPLIANT WITH THE VA'S HVAC DESIGN MANUAL. EXISTING DUCTWORK SHALL BE CLEANED, SEALED AND TESTED TO MEET CURRENT DESIGN CRITERIA.

2 SHADED AREAS OF THIS PLAN ARE NOT WITHIN THE PROJECT SCOPE OF WORK AND ARE SHOWN FOR REFERENCE ONLY.

3 LOCATION OF EXISTING EQUIPMENT, DUCTWORK, AIR OUTLETS, CONTROLS AND ALL CONCEALED WORKS, ETC. ARE APPROXIMATE. THE CONTRACTOR SHALL EXAMINE THE SITE PRIOR TO BUILDING AND AFTER DEMOLITION HAS EXPOSED "AS-BUILT" CONDITIONS TO VERIFY EACH AIR OUTLET, AND EQUIPMENT LOCATION. THE CONTRACTOR SHALL MAKE ADJUSTMENTS AND/OR ALTERATIONS AS NECESSARY TO INSTALL COMPLETE AND OPERABLE SYSTEMS IN ACCORDANCE WITH THE CODES HAVING JURISDICTION AT NO ADDITIONAL COST TO THE GOVERNMENT

4 ALL OPENINGS AND SURFACES MADE BARE BY DEMOLITION AND/OR REMOVAL OF AIR OUTLETS, EQUIPMENT, CONTROLS, ETC. SHALL BE REPAIRED AND/OR PATCHED TO MATCH ADJACENT FINISH. PREPARE SURFACES TO RECEIVE NEW FINISH, SEE ARCHITECTURAL DRAWINGS FOR NEW FINISH SCHEDULE. ALL REPAIRS AND NEW FINISH SHALL BE BY TRADES SKILLED IN FINISH WORKS UNDER EMPLOY OF THE GENERAL CONTRACTOR.

5 DURING THE LIFE OF THE CONTRACT (CONSTRUCTION AND DEMOLITION TO POINT OF BENEFICIAL OCCUPANCY BY OWNER) THE CONTRACTOR SHALL PROTECT ALL SYSTEMS OR PORTIONS OF SYSTEMS TO REMAIN FOR REUSE FROM DAMAGE. ALL SYSTEMS SHALL BE TESTED IN SERVICE AFTER COMPLETION OF THE CONTRACT AND MADE COMPLETE AND OPERABLE AT NO ADDITIONAL COST TO THE GOVERNMENT.

6 DEMOLISH CONTROLS AND DEVICES PERTAINING TO THE HVAC EQUIPMENT BEING DEMOLISHED, REPLACED OR RE-USED. PROVIDE NEW CONTROLS AND DEVICES FOR ALL RE-USED EQUIPMENT AND CONNECT INTO THE EXISTING DDC SYSTEM.

7 SEE ARCHITECTURAL DRAWINGS AND SPECIFICATION FOR ADDITIONAL INFORMATION. COORDINATE ALL DEMOLITION WITH ALL TRADES INVOLVED.

8 DEMOLISH ALL PIPING BACK TO THE MAIN AND CAP. LEAVE NO DEAD END BRANCHES. NO PIPING SHALL BE ABANDONED ABOVE THE CEILING OR BELOW THE FLOOR UNLESS NOTED OTHERWISE. PATCH FLOOR AND WALL PENETRATIONS LEFT BEHIND FROM DEMOLISHED PIPING TO MATCH EXISTING CONDITIONS .

9 ALL WORK MUST BE ACCOMPLISHED IN PHASES AS SPECIFIED AND/OR INDICATED. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. THE BUILDING WILL BE OCCUPIED AND IN OPERATION DURING THE LIFE OF THE CONTRACT. WORK SHALL BE ACCOMPLISHED IN AREAS AND/OR PHASES SO AS TO PERMIT CONTINUOUS OPERATION OF THE FACILITIES. THESE FACILITIES ARE IN USE 24 HOURS PER DAY, 7 DAYS A WEEK. THE CONTRACTOR SHALL PROVIDE TEMPORARY SERVICES AS REQUIRED TO MAINTAIN SYSTEMS (INCLUDING FIRE DETECTION/ALARM,LIFE SAFETY, FIRE PROTECTION SYSTEMS, HVAC SYSTEMS, CONTROL SYSTEMS, ETC.)

10 THE CONTRACTOR SHALL COORDINATE WITH THE COR FOR ACCESS TO AREAS OF THE BUILDING NOT IN CONTRACT WHICH WILL REMAIN OPERATIONAL DURING CONSTRUCTION. ANY BREAKS IN UTILITY OR HVAC SERVICE SHALL BE COORDINATED WITH THE COR PRIOR TO WORK COMMENCING.

11 THE CONTRACTOR SHALL TAKE PRECAUTIONS DURING DEMOLITION AND CONSTRUCTION TO PREVENT FIRE ALARMS NOT INDICATIVE OF ACTUAL CONDITIONS (I.E. FALSE) BY THE SMOKE DETECTOR CAUSED BY THE DISTURBANCE OF DUST.

ABBREVIATIONS

DN	DOWN	AHU-X	AIR HANDLING UNIT DESIGNATION
EXH	EXHAUST	CHWP-X	CHILLED WATER PUMP DESIGNATION
EA	EXHAUST AIR	CRU-X	CONDENSATE RETURN UNIT DESIGNATION
(E)	EXISTING	EF-X	EXHAUST FAN DESIGNATION
EXF	EX-FILTRATE	ET-X	EXPANSION TANK DESIGNATION
INF	INFILTRATE	HX-X	HEAT EXCHANGER DESIGNATION
NIC	NOT IN CONTRACT	HWP-X	HEATING HOT WATER PUMP DESIGNATION
SA	SUPPLY AIR	SPSS-X	STATIC PRESSURE SENSOR DESIGNATION
RA	RETURN AIR	ST-X	STEAM TRAP DESIGNATION
RH	RE-HEAT	V-X	VALVE DESIGNATION
		VF-X	VENTILATION FAN DESIGNATION

LEGEND

DIFFUSER, SUPPLY

RETURN AIR OUTLET

EXHAUST AIR OUTLET

VAV-X — VARIABLE AIR VOLUME (NEW) "X" INDICATES DEVICE NUMBER

BALANCING DAMPER - RECTANGULAR

BALANCING DAMPER - ROUND

AUTOMATIC CONTROL DAMPER - RECTANGULAR

SIMPLE RECTANGULAR FIRE DAMPER

BALANCING VALVE

BALL VALVE

BUTTEFLY VALVE

CONTROL VALVE

GATE VALVE

GLOBE VALVE

AIR SEPEERATOR W/ STRAINER INLINE

EXPANSION TANK

PRESSURE GAUGE

TEMPERATURE GAUGE

Y STRAINER - FLANGED

CAPPED PIPING

RISE

DROP

ECCENTRIC REDUCER

CENTRIFUGAL PUMP

POINT OF DISCONNECTION (P.O.D)

POINT OF CONNECTION (P.O.C)

(T)□ — SPACE TEMPERATURE SENSOR, "□" INDICATES DEVICE CONTROLLED

(1) — NOTE NUMBER (SEE SCHEDULE)

1i — TAG
20 — CFM
AIR TERMINAL TAG

HWR — HOT WATER RETURN

HWS — HOT WATER SUPPLY

CHR — CHILLED WATER RETURN

CHS — CHILLED WATER SUPPLY

CR — AIR TERMINAL TAG

LPS — LOW PRESSURE STEAM

CD — AIR TERMINAL TAG

DEMOLISH LINE TYPE

ITEMS TO BE DEMOLISHED

CONSTRUCTION DOCUMENTS
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COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS — Lic. No. 0402035691 — 4-18-17 — PROFESSIONAL ENGINEER

Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title: **MECHANICAL LEGENDS AND ABBREVIATIONS**

Approved: Chief of Facility Management Svc.

Approved: Medical Center Director

Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**

Building Number: 2 | Checked: CMD | Drawn: JDG

Location: SALEM VA MEDICAL CENTER

Date: 2018.02.16

Project No.: 658-315

Drawing No.: **MH000**

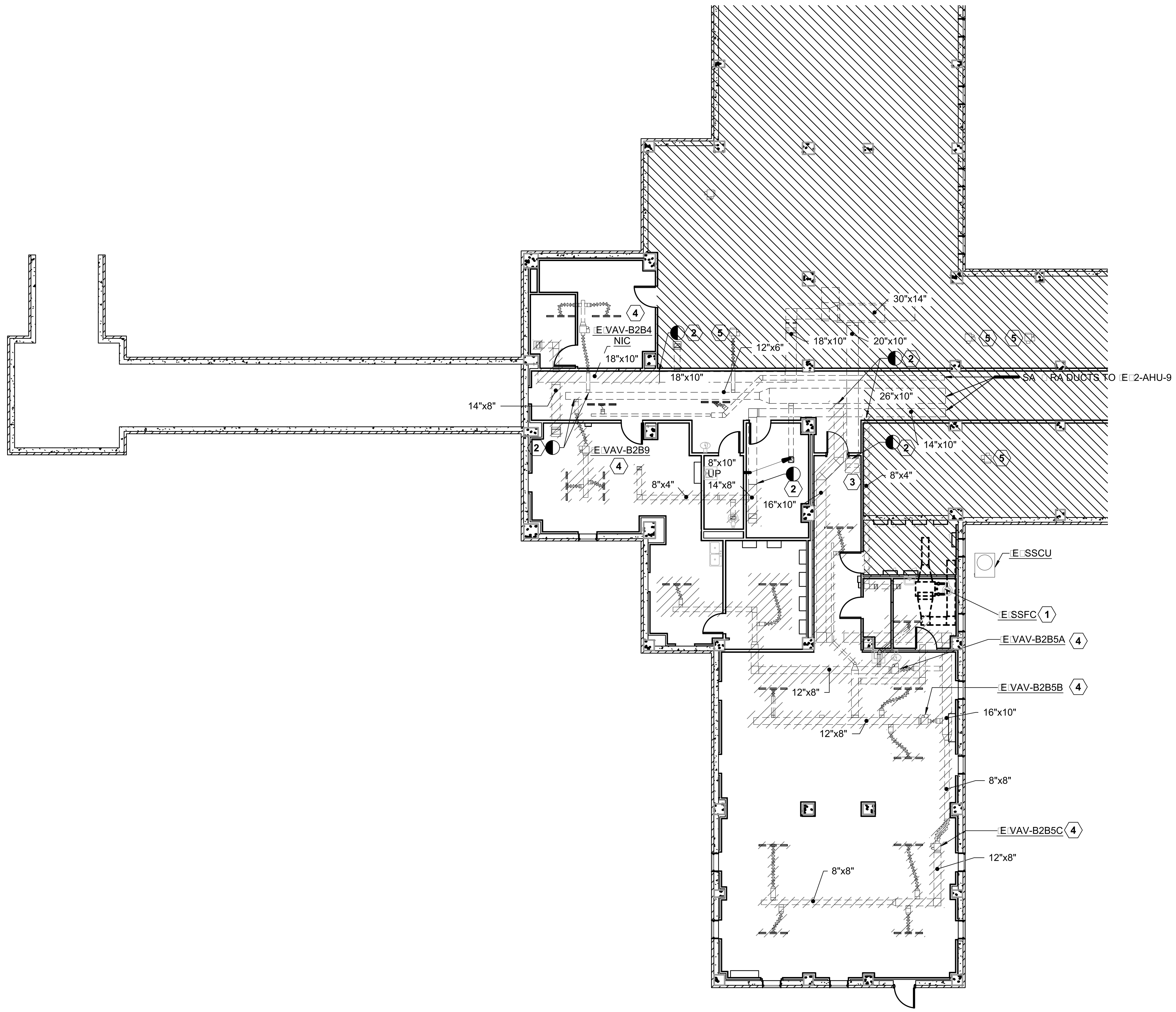
Sheet 88 of 120

Veterans Affairs

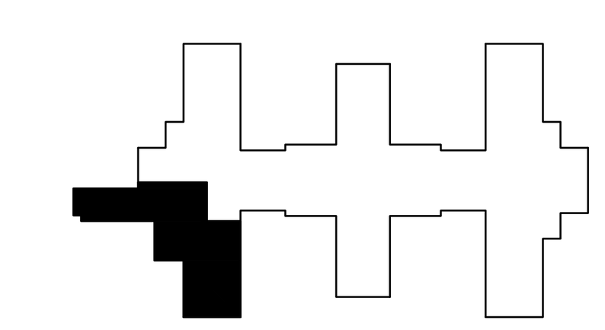
VA FORM 08-6231, OCT 1978

ⓧ DRAWING KEYED NOTES

1. EXISTING SPLIT SYSTEM FAN COIL UNIT TO BE RELOCATED TO AVOID INTERFERENCE WITH NEW TELECOMM CLOSET. COORDINATE WITH ELECTRICAL CONTRACTOR FOR THE RELOCATION. REFER TO SHEET MH101.
2. DEMOLISH DUCTWORK BACK TO POINT INDICATED. CAP AND INSLUATE TO MATCH EXISTING, TYPICAL.
3. DEMOLISH AIR DEVICE, AND ALL RELATED ACCESSORIES. CAP DUCT AND INSULATE TO MATCH EXISTING, TYPICAL.
4. CAREFULLY DEMOLISH VAV TERMINAL UNIT, AND ALL RELATED WIRING, AND CONTROLS. PROTECT AND DELIVER TERMINAL UNIT WHERE DIRECTED BY THE COR WITHIN 5 MILES OF SITE, TYPICAL.
5. VAV TERMINAL UNIT SHALL REMAIN AS EXISTING, TYPICAL.
6. GENERAL: ALL DUCTWORK AND EQUIPMENT LOCATED ABOVE CEILING UNO.
7. ALL REFRIGERANT CONTAINING EQUIPMENT SHALL BE EVACUATED PRIOR TO REMOVAL, RELOCATION AND/OR DEMOLITION PER THE LATEST EPA GUIDELINES. DISPOSAL OF REFRIGERANTS IS THE RESPONSIBLITY OF THE CONTRACTOR.



1 MECHANICAL DUCTWORK DEMOLITION PLAN - BASEMENT
1/8" = 1'-0"



PLAN NORTH

KEY PLAN

BASEMENT FFE: 1091.3'

0 4' 8' 16'

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

CONSTRUCTION DOCUMENTS
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Revisions: | Date

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Lic. No. 0402035691
4-18-17

Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title
MECHANICAL DUCTWORK DEMOLITION PLAN - BASEMENT

Approved: Chief of Facility Management Svc.

Approved: Medical Center Director

Project Title
RELOCATE AND EXPAND RENAL DIALYSIS

Building Number: 2 | Checked: CMD | Drawn: JDG

Location: SALEM VA MEDICAL CENTER

Date: 2018.02.16

Project No.: 658-315

Drawing No.: **MD101**

Sheet 89 of 120

Veterans Affairs

VA FORM 08-6231, OCT 1978

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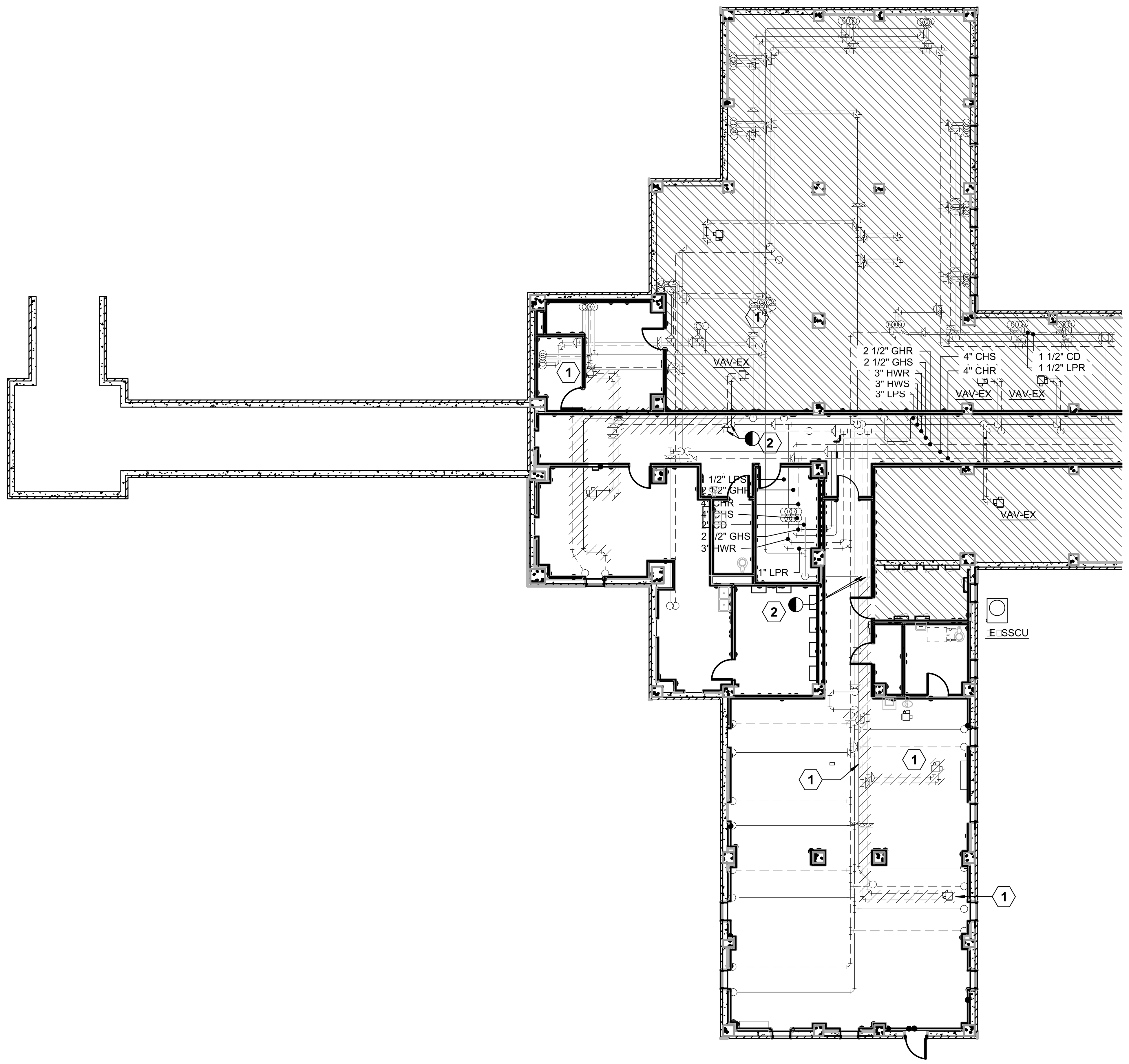
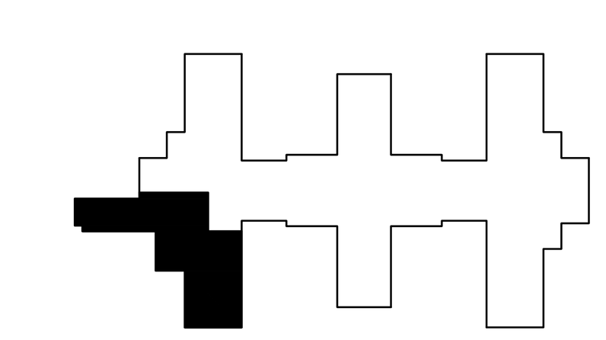
DRAWING KEYED NOTES

1. CAREFULLY DEMOLISH VAV TERMINAL UNIT, ALL ASSOCIATED PIPING, VALVES, CONTROL WIRING, AND POWER WIRING. PROTECT TERMINAL UNIT AND DELIVER WHERE DIRECTED TO THE COR WITHIN 5 MILES OF SITE, TYPICAL.
2. DEMOLISH PIPING AND INSULATION BACK TO POINT INDICATED, CAP AND INSULATION TO MATCH EXISTING PIPING.



1 **MECHANICAL PIPING DEMOLITION PLAN - BASEMENT**
1/8" = 1'-0"



PLAN NORTH

KEY PLAN
BASEMENT FFE: 1091.3'

0 4' 8' 16'
SCALE: 1/8" = 1'-0"

CONSTRUCTION DOCUMENTS
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Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief	
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff	
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director	

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Drawing Title: **MECHANICAL PIPING DEMOLITION - BASEMENT**

Approved: Chief of Facility Management Svc.

Approved: Medical Center Director

Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**

Building Number: 2 | Checked: CMD | Drawn: JDG

Location: SALEM VA MEDICAL CENTER

Date: 2018.02.18

Project No.: 658-315

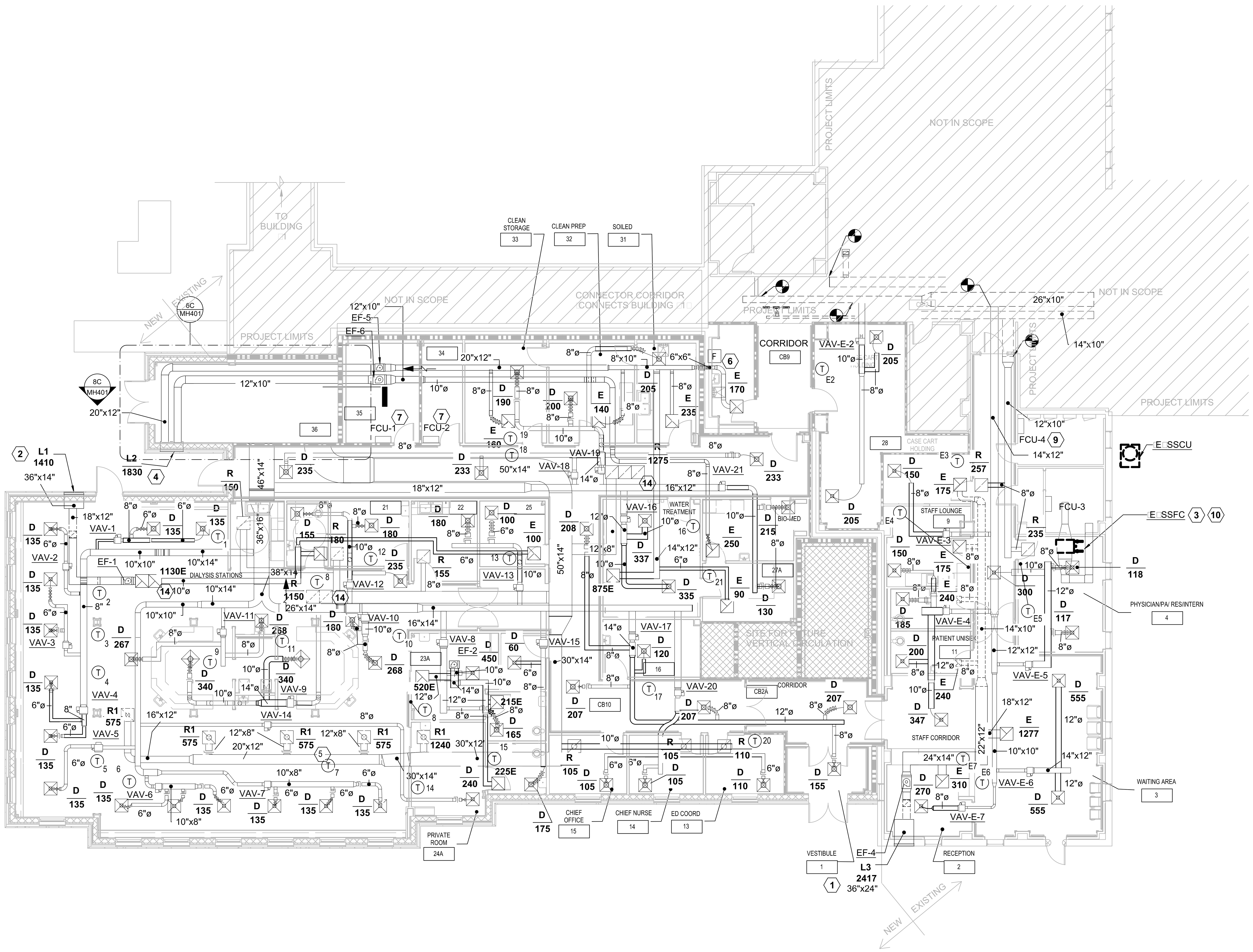
Drawing No.: **MD102**

Sheet 90 of 120

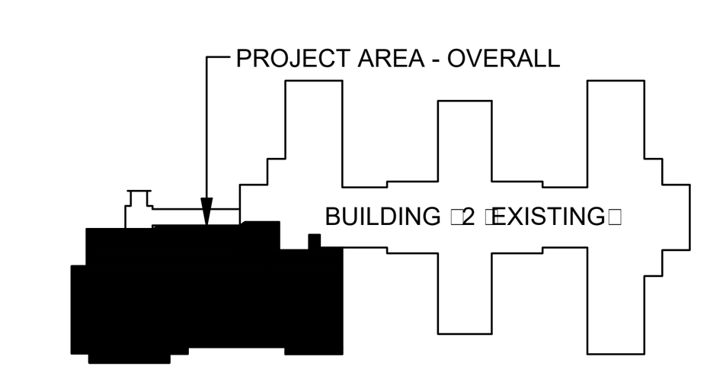
Veterans Affairs

DRAWING KEYED NOTES

1. 36"x14" EXTERIOR WALL LOUVER, WITH MINIMUM 1.9 SF FREE AREA. SEE ARCHITECTURAL DETAILS AND ELEVATIONS FOR ADDITIONAL INFORMATION.
2. 36"x14" EXTERIOR WALL LOUVER, WITH MINIMUM 1.81 SF FREE AREA. SEE ARCHITECTURAL DETAILS AND ELEVATIONS FOR ADDITIONAL INFORMATION.
3. RELOCATE EXISTING SPLIT SYSTEM FAN COIL TO PREVENT INTERFERENCES WITH PLUMBING DRAIN PIPING AND DUCTWORK IN TELECOMM CLOSET. EXTEND REFRIGERANT AND PLUMBING LINES TO E SSFC, AS REQUIRED. SEE SHEET MD01 FOR ADDITIONAL INFORMATION.
4. 42"x10" EXTERIOR WALL LOUVER, WITH MINIMUM 2.3 SF FREE AREA PROVIDED BY OTHERS. SEE ARCHITECTURAL DETAILS AND ELEVATIONS FOR ADDITIONAL INFORMATION.
5. MOUNT TEMPERATURE SENSOR ON CEILING. TYPICAL OF TEMPERATURE SENSORS FOR VAV-1,2,3,4,5,6,7 9.
6. PROVIDE FIRE DAMPER AT DUCT PENETRATION THROUGH 2 HR FIRE RATED WALL. TYPICAL
7. ROUTE 3/4" CONDENSATE FCU TO MECHANICAL ROOM FLOOR DRAIN.
8. NOT USED.
9. ROUTE 1/2" CONDENSATE FROM FCU SUMP PUMP TO EXISTING HUB DRAIN A/C. FIELD VERIFY EXACT LOCATION.
10. ROUTE 3/4" CONDENSATE FROM E SSFC TO EXISTING HUB DRAIN A/C. FIELD VERIFY EXACT LOCATION.
13. EF-2, ISOLATION ROOM EXHAUST FAN ON ROOF. LABEL ISOLATION ROOM EXHAUST DUCTWORK BIO-HA ARDOUS.
14. PROVIDE PLENUM BOX OVER OUTLETS. TAP BOX APPROXIMATELY AS SHOWN.



8F MECHANICAL DUCTWORK NEW WORK PLAN - BASEMENT
1/8" = 1'-0"



KEY PLAN

PLAN NORTH

BASEMENT FFE: 1091.3

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

CONSTRUCTION DOCUMENTS
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4-18-17

Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title: MECHANICAL DUCTWORK NEW WORK PLAN - BASEMENT

Project Title: RELOCATE AND EXPAND RENAL DIALYSIS

Date: 2018.02.16

Project No.: 658-315

Approved: Chief of Facility Management Svc.

Approved: Medical Center Director

Building Number: 2 | Checked: CMD | Drawn: JDG

Location: SALEM VA MEDICAL CENTER

Drawing No.: MH101

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Veterans Affairs

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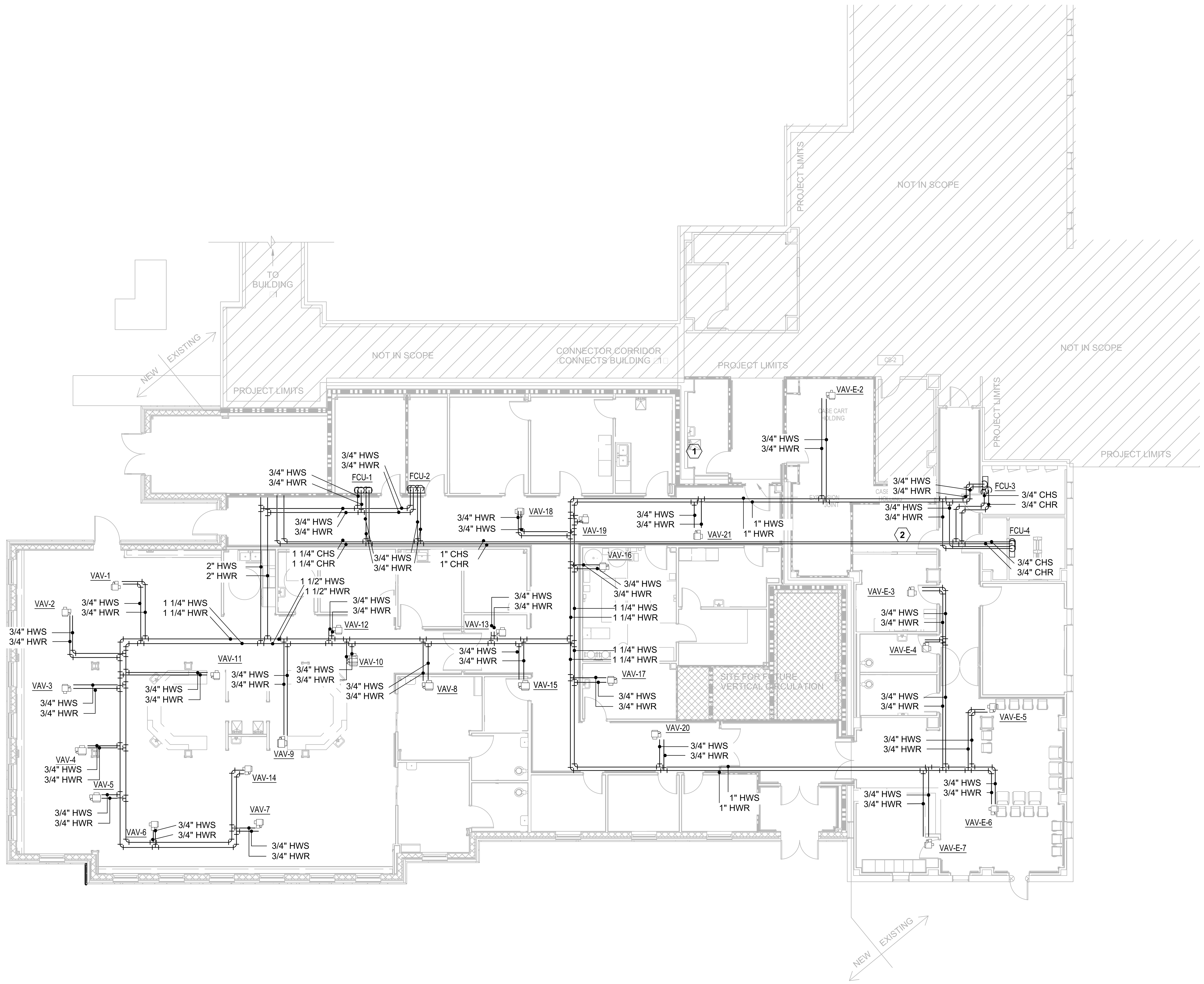
VA FORM 08-6231, OCT 1978

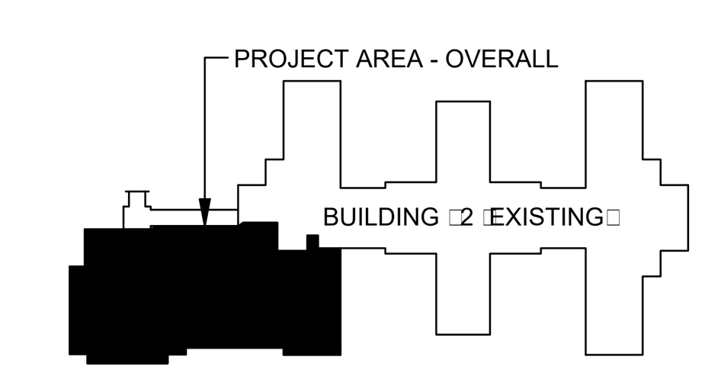
DRAWING KEY NOTES

1. CONNECT TO EXISTING STEAM AND CONDENSATE PIPING. CONTRACTOR SHALL COORDINATE DISCONNECTION AND RECOONECTION WITH OWNER, BEFORE ANY WORK BEGINS.
2. CONNECT TO EXISTING HEATING HOT WATER SUPPLY AND RETURN PIPING. INSTALL SHUT OFF VALVES TO PROVIDE MEANS OF BRANCH ISOLATION.



8F MECHANICAL PIPING NEW WORK PLAN - BASEMENT

1/8" = 1'-0"



KEY PLAN

PLAN NORTH

BASEMENT FFE: 1091.3'

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

CONSTRUCTION DOCUMENTS

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	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Revisions: | Date

Drawing Title	MECHANICAL PIPING NEW WORK PLAN - BASEMENT
Approved: Chief of Facility Management Svc.	
Approved: Medical Center Director	
Project Title	RELOCATE AND EXPAND RENAL DIALYSIS
Building Number	2
Checked	CMD
Drawn	JDG
Location	SALEM VA MEDICAL CENTER
Date	2018.02.16
Project No.	658-315
Drawing No.	MH102
Sheet	92 of 120

Veterans Affairs

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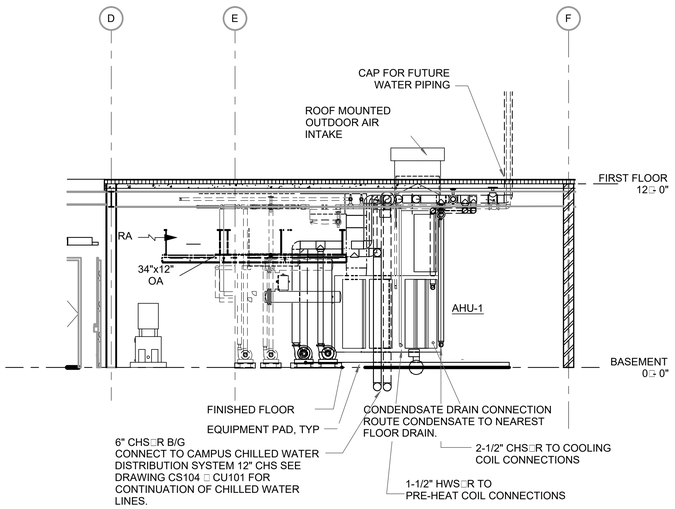
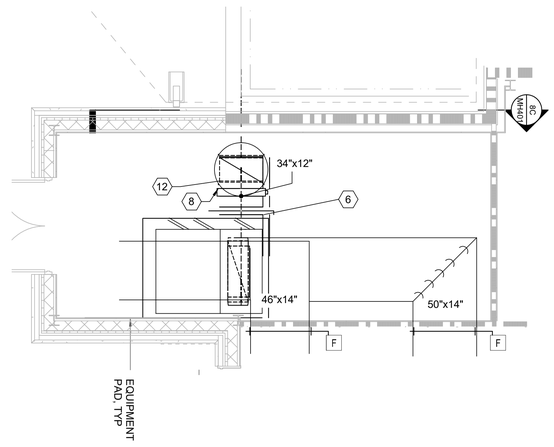
VA FORM 08-6231, OCT 1978



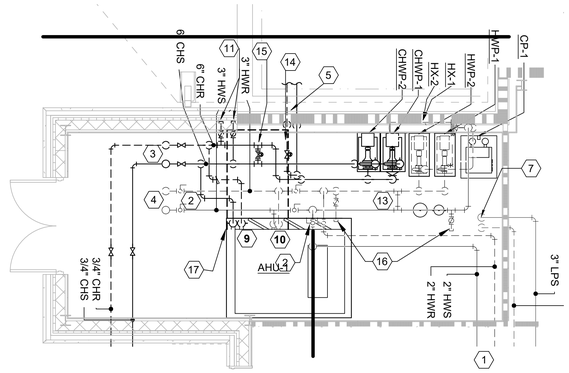
8C MECHANICAL SECTION - HVAC ROOM - 1

1/4" = 1□0"



6C ENLARGED DUCTWORK PLAN - MECHANICAL ROOM

1/4" = 1□0"



3C ENLARGED PIPING PLAN - MECHANICAL ROOM

1/4" = 1□0"

DRAWING KEY NOTES

1. 2" HWS/R TO BASEMENT VAV TERMINAL UNITS
2. SHUT-OFF VALVE □TYPICAL□
3. 4" CHILLED WATER SUPPLY AND RETURN UP THROUGH FUTURE CHASE. PROVIDE CAPPED PIPING CONNECTIONS BELOW ROOF DECK ABOVE FOR FUTURE CONNECTION.
4. 3" HEATING HOT WATER SUPPLY AND RETURN UP THROUGH FUTURE CHASE. PROVIDE CAPPED PIPING CONNECTIONS BELOW ROOF DECK ABOVE FOR FUTURE CONNECTION.
5. 6" CHILLED WATER SUPPLY AND RETURN. PROVIDE BUTTERFLY SHUT-OFF VALVES IN VERTICAL RUN FOR BUILDING ISOLATION. REFER TO CIVIL SITE DRAWINGS FOR CONTINUATION AND CONNECTION TO EXISTING CAMPUS CHILLED WATER.
6. AFMS, DUCT MOUNTED AIR FLOW MEASURING STATION. FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS TO ENSURE A UNIFORM VELOCITY PROFILE NECESSARY FOR ACCURATE AIR FLOW MEASUREMENT.
7. 3" LPS AND 1" LPR DOWN TO HEAT EXCHANGER AND DOMESTIC WATER HEATER. COORDINATE CONNECTION TO DOMESTIC WATER HEATER WITH DIVISION 22 00 00 CONTRACTOR.
8. 36X54 HOODED INTAKE WITH LOW-LEAKAGE MOTOR OPERATED DAMPER, WITH MINIMUM THROAT AREA 13.5 SF FREE AREA. COORDINATE INSTALLATION WITH ARCHITECT, TYP.
9. 2 1/2" CHILLED WATER SUPPLY AND RETURN DOWN TO AHU-1.
10. 1 1/2" HEATING HOT WATER SUPPLY AND RETURN DOWN TO AHU-1 PRE HEAT COIL.
11. PROVIDE 4" EMERGENCY CHS□R CONNECTION POINTS WITH BUTTERFLY SHUT-OFF VALVE AND BLANK FLANGE FOR FUTURE CONNECTION.
12. TRANSITION 34X20 OA DUCT UP TO FULLSI□E OF HOODED INTAKE.
13. HW LOOP BY-PASS CONTROL VALVE.
14. CHW DECOUPLER CONTROL VALVE.
15. CHW LOOP BY-PASS CONTROL VALVE.
16. PROVIDE 3" EMERGENCY HWS□R CONNECTION POINTS WITH BUTTERFLY SHUT-OFF VALVE AND BLANK FLANGE FOR FUTURE CONNECTION.
17. AHU COIL PULL CLEARANCE SHOWN DASHED.

0 2□ 4□ 8□

SCALE: 1/4" = 1□0"

CONSTRUCTION DOCUMENTS
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COMMONWEALTH OF KENTUCKY — BOLTON — Lic. No. 0402035691 — 4-18-17 — PROFESSIONAL ENGINEER

Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title: **ENLARGED MECHANICAL PLANS AND SECTIONS**	Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**		Date: 2018.02.16
			Project No.: 658-315
Approved: Chief of Facility Management Svc.	Building Number: 2	Checked: CMD	Drawn: JDG
Approved: Medical Center Director	Location: SALEM VA MEDICAL CENTER		Drawing No.: **MH401** Sheet 93 of 120

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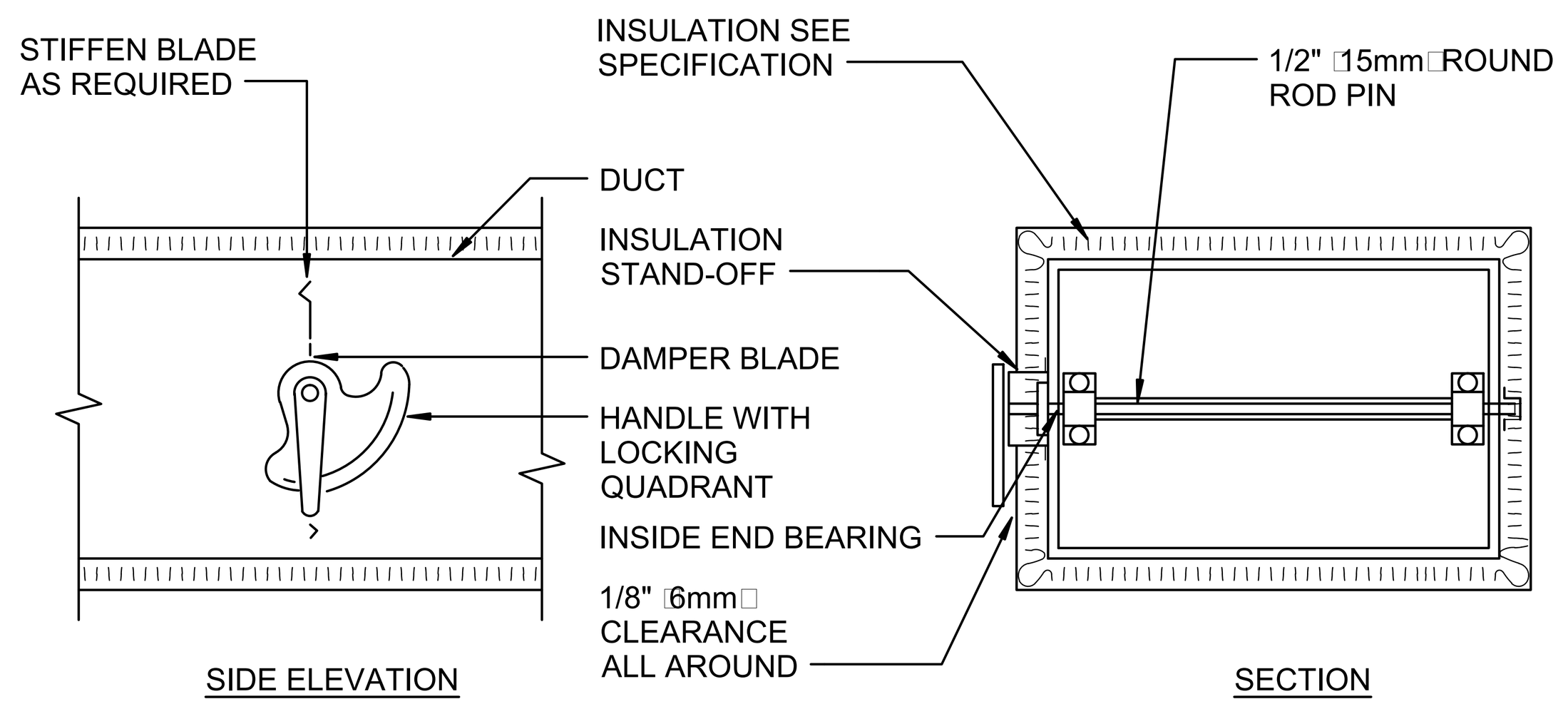
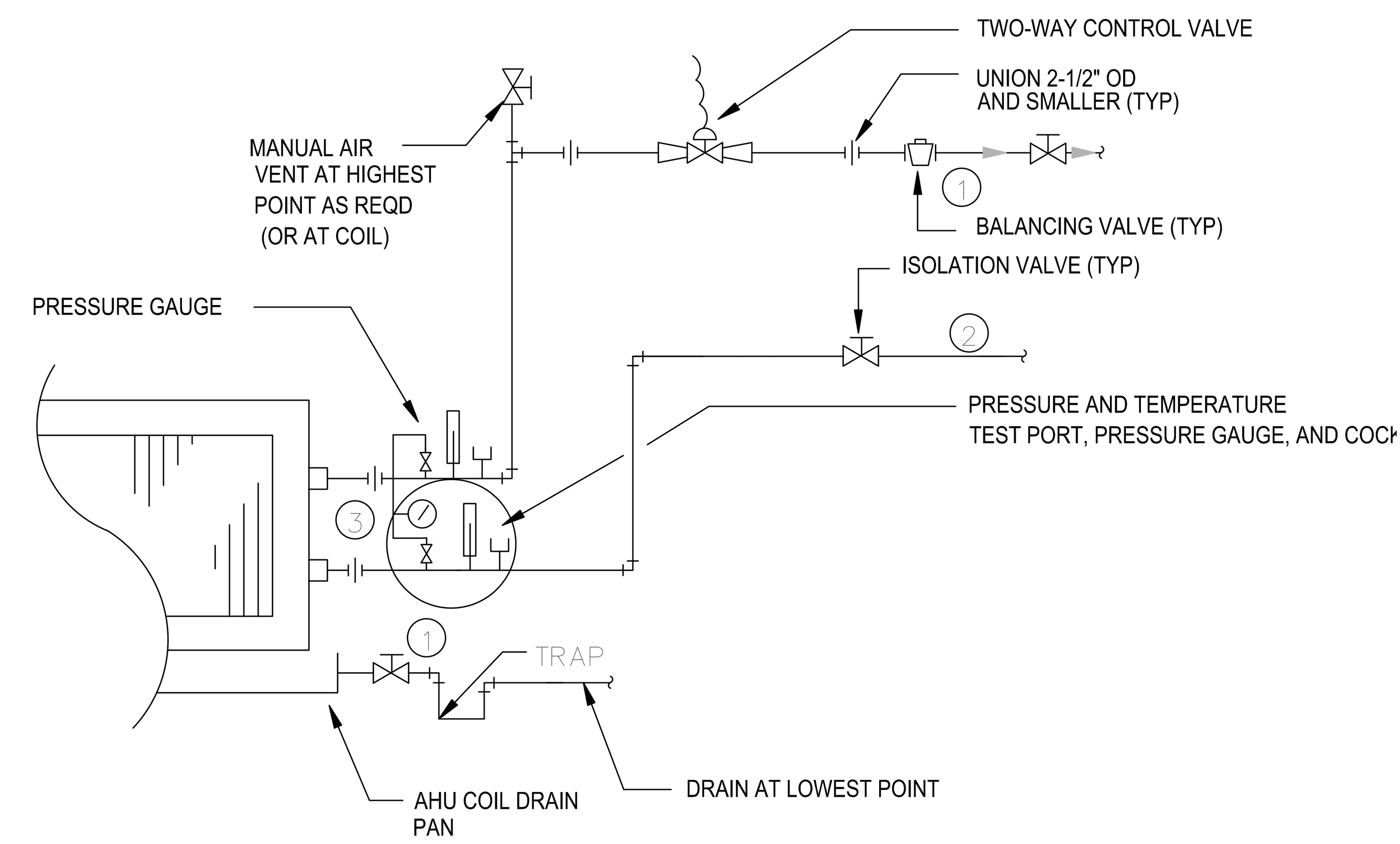


NOTE:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS ROUND DAMPERS.

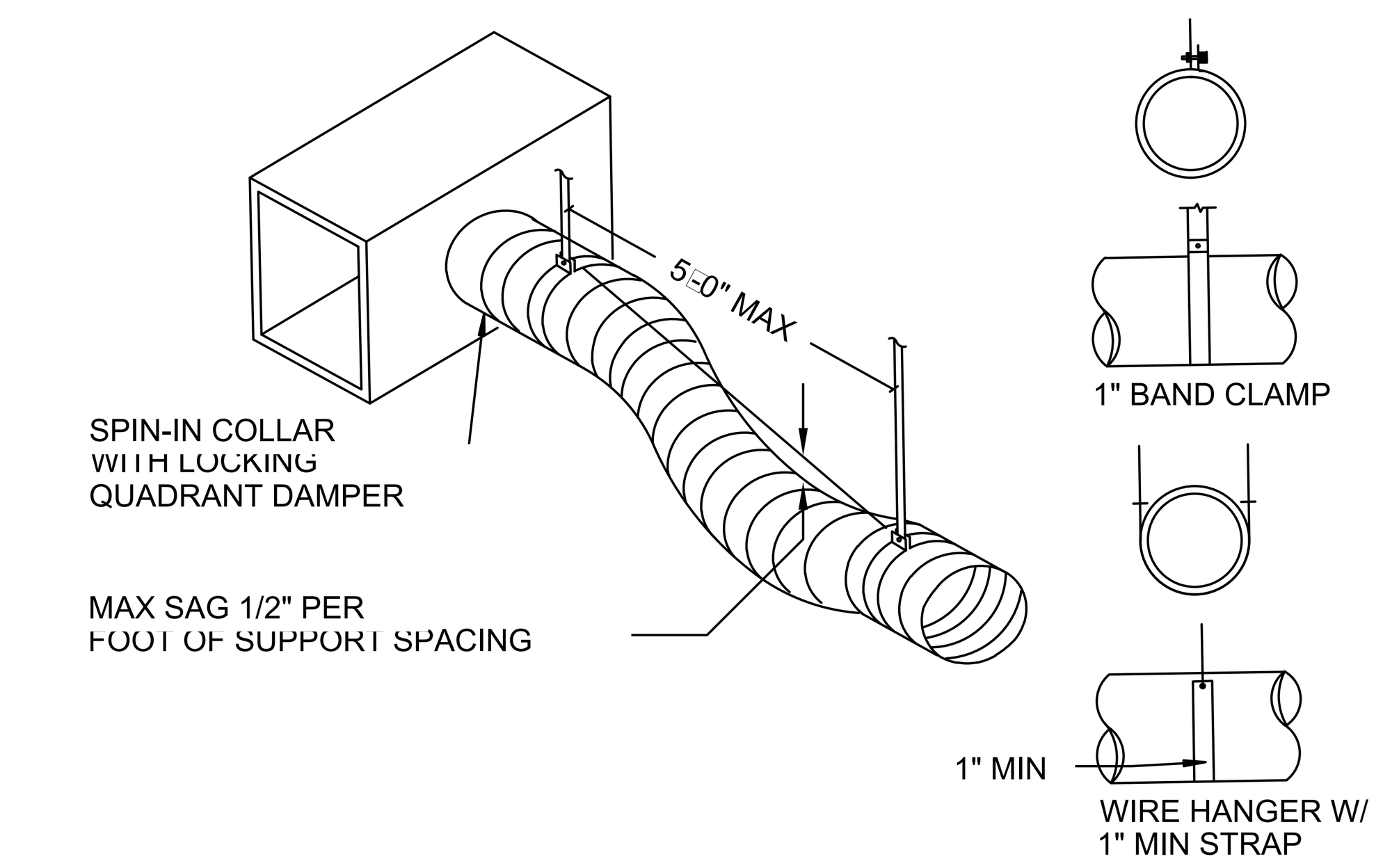
9B DETAIL - VOLUME DAMPER
NTS



NOTES:

1. SIZE BALANCING VALVE (CIRCUIT SETTER) FOR FLOW AS SCHEDULED AND PROVIDE REDUCERS AS NECESSARY.
2. PIPING ARRANGEMENT IS FOR DIRECTION OF FLOW AS SHOWN; REFER TO MFG'S SPECIFIC PIPING REQUIREMENTS.
3. PROVIDE DIELECTRIC UNIONS WHERE PIPING AND APPENDAGE MATERIALS DIFFER

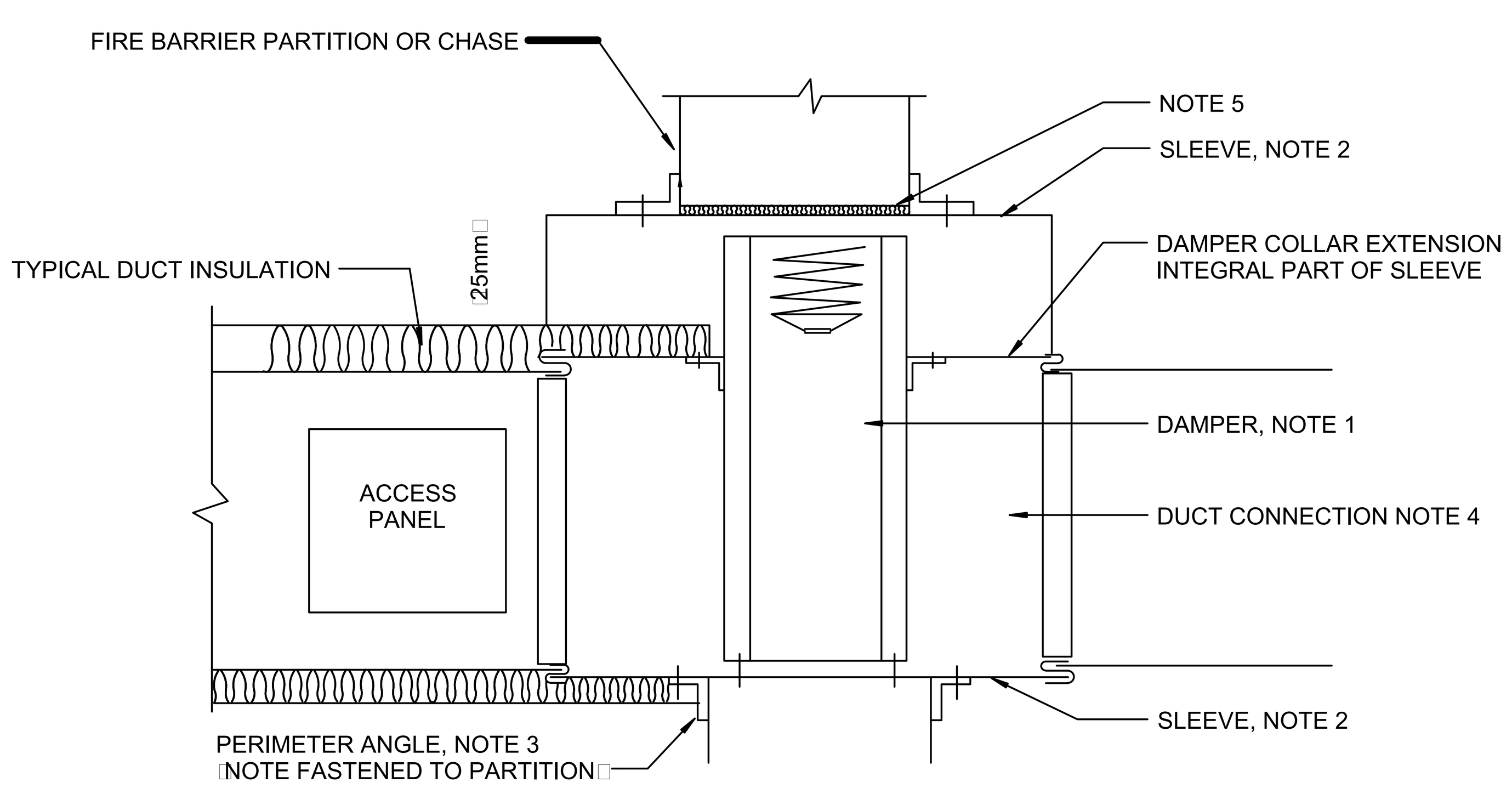
6C AHU TWO-WAY VALVE, GAUGES AND THERMOMETERS
NTS



NOTES

1. SUPPORT SYSTEM MUST NOT DAMAGE DUCT OR CAUSE OUT OF ROUND SHAPE.
2. DUCTS ARE FLEXIBLE WITH EXTERNAL INSULATION AND VAPOR BARRIER JACKETING.
3. MINIMUM CENTERLINE BEND RADIUS IS ONE DIAMETER. (OR INSIDE RADIUS OF D/2).
4. MAXIMUM LENGTH OF FLEXIBLE DUCT RUNOUT IS FIVE (5) FEET.

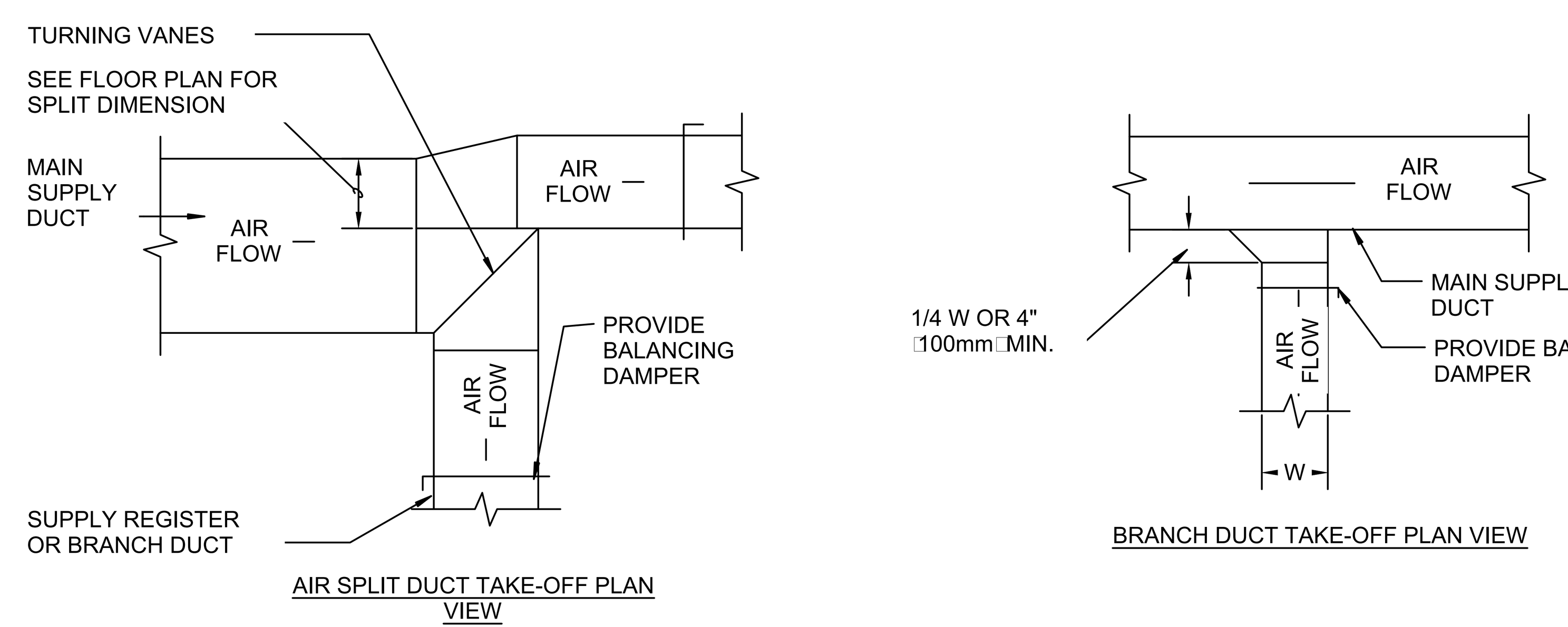
3B DETAIL - STRAIGHT SECTION OF FLEXIBLE DUCTWORK
NTS



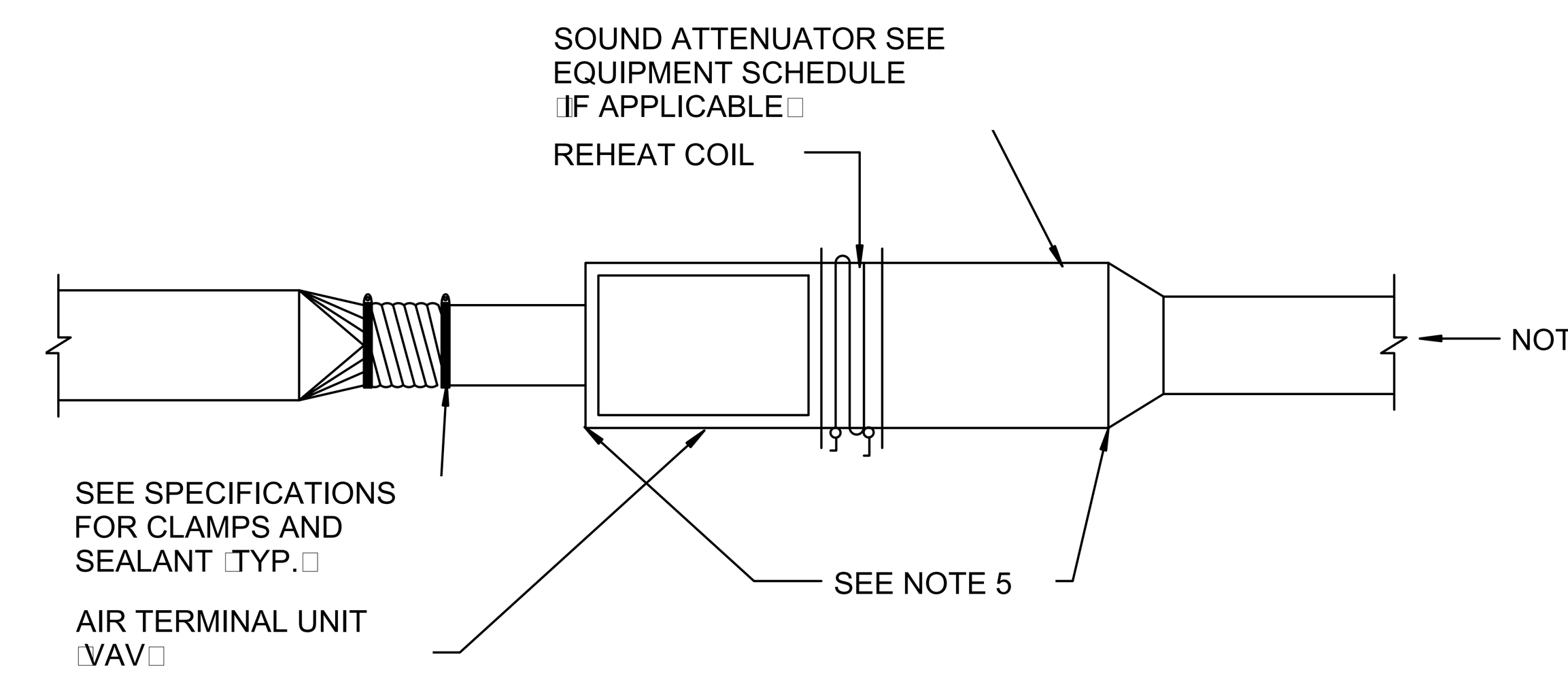
NOTE:

1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, IS SIMILAR. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION OR FLOOR AND NOT OUTSIDE THE PENETRATION.
2. GALVANIZED SLEEVE: GAGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.
3. PERIMETER ANGLES: GALVANIZED STEEL, NOT LESS THAN 1 1/2"x1 1/2" (40x40mm), 14 GAGE, TO PROVIDE 1" (25mm) MINIMUM OVERLAP OF OPENING ON ALL 4 SIDES.
4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES SHOWN IN SMACNA. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS.
5. PROVIDE 1/4" TO 1/2" (6 TO 15mm) CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.

8F DETAIL - FIRE DAMPER INSTALLATION
NTS



6F DETAIL - SUPPLY DUCTWORK TAKE OFFS
NTS



NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET
2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'-0" (900mm)
3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' (1.64Pa/m)
4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0" (1500mm). USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.

3F DETAIL - TYPICAL DUCT CONNECTIONS AIR TERMINAL UNITS
NTS

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4-18-17

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Drawing Title: MECHANICAL DETAILS	Project Title: RELOCATE AND EXPAND RENAL DIALYSIS			Date: 2018.02.16
				Project No.: 658-315
Approved: Chief of Facility Management Svc.	Building Number: 2	Checked: CMD	Drawn: JDG	Drawing No.: MH501
Approved: Medical Center Director	Location: SALEM VA MEDICAL CENTER			Sheet 94 of 120

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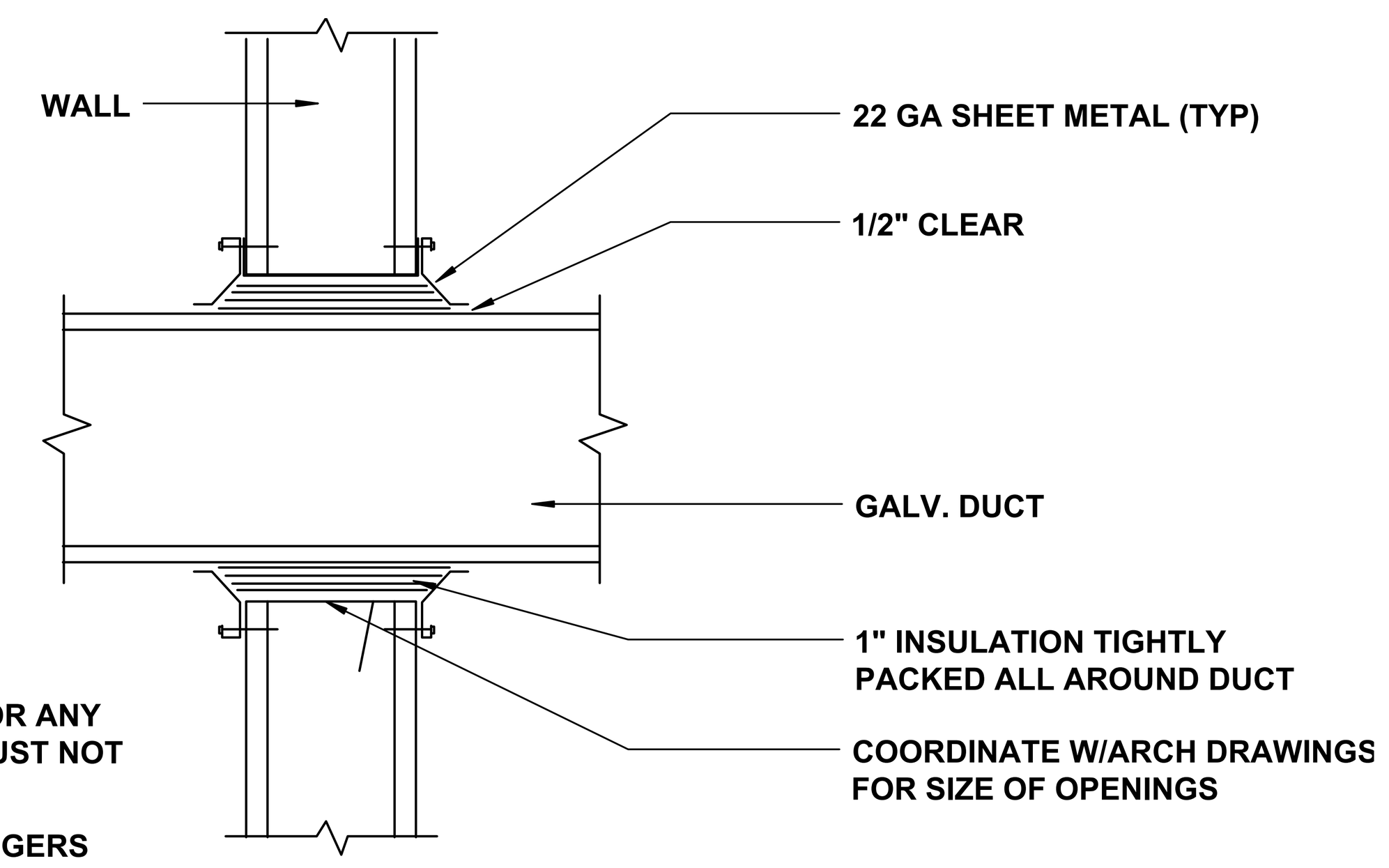
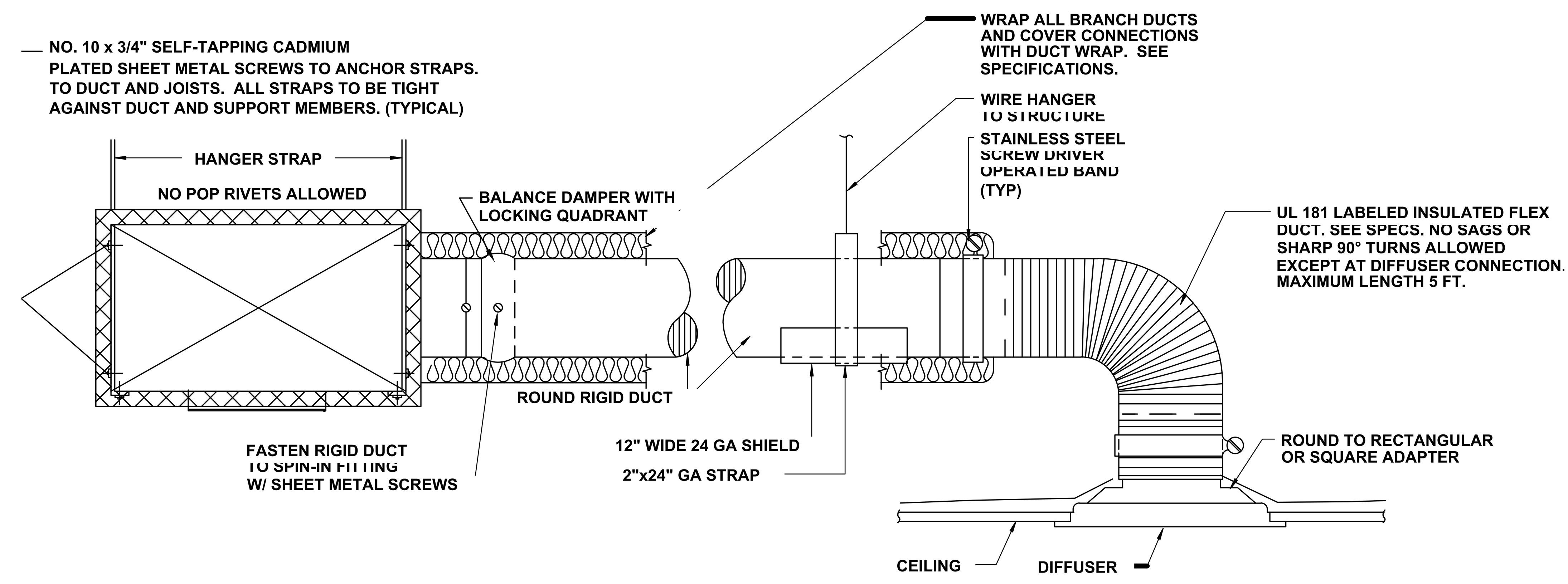


NOTES:

1. DRYWALL, METAL STUDS OR ANY OTHER RIGID MATERIAL MUST NOT TOUCH DUCT
2. SUPPORT DUCT FROM HANGERS FOR ACOUSTICAL CONTROL

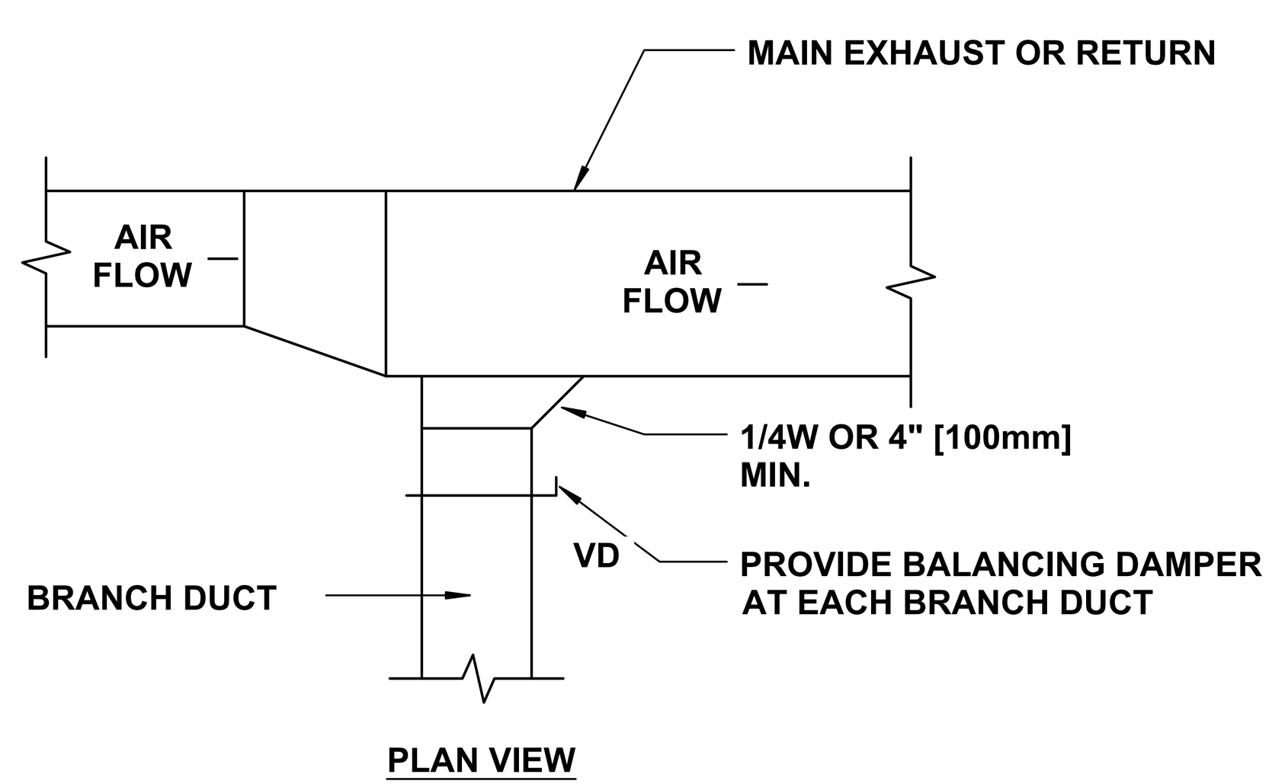
8B DETAIL - TYPICAL DUCTWORK PENETRATION - NON FIRE RATED WALL

NTS



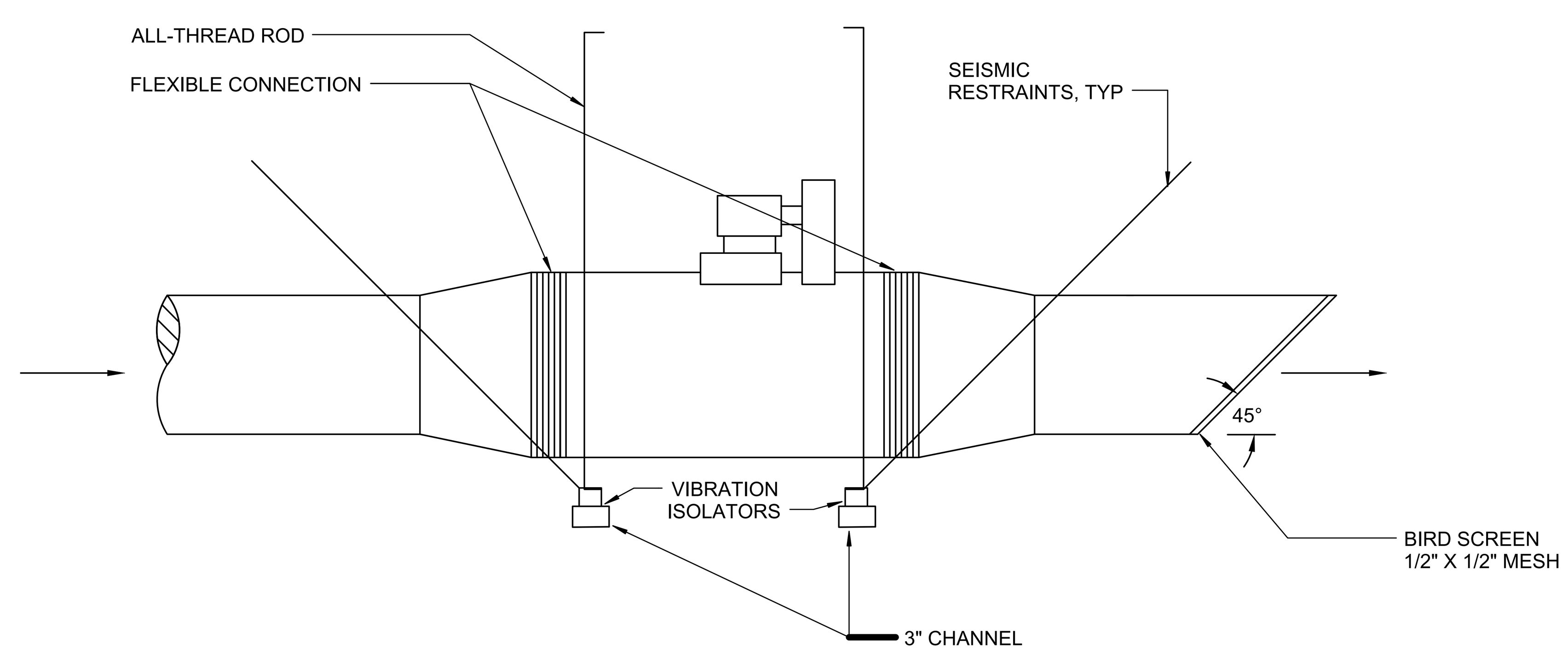
3B DETAIL - TYPICAL DIFFUSER CONNECTION

NTS



8E DETAIL - EXHAUST OR RETURN BRANCH DUCTWORK

NTS



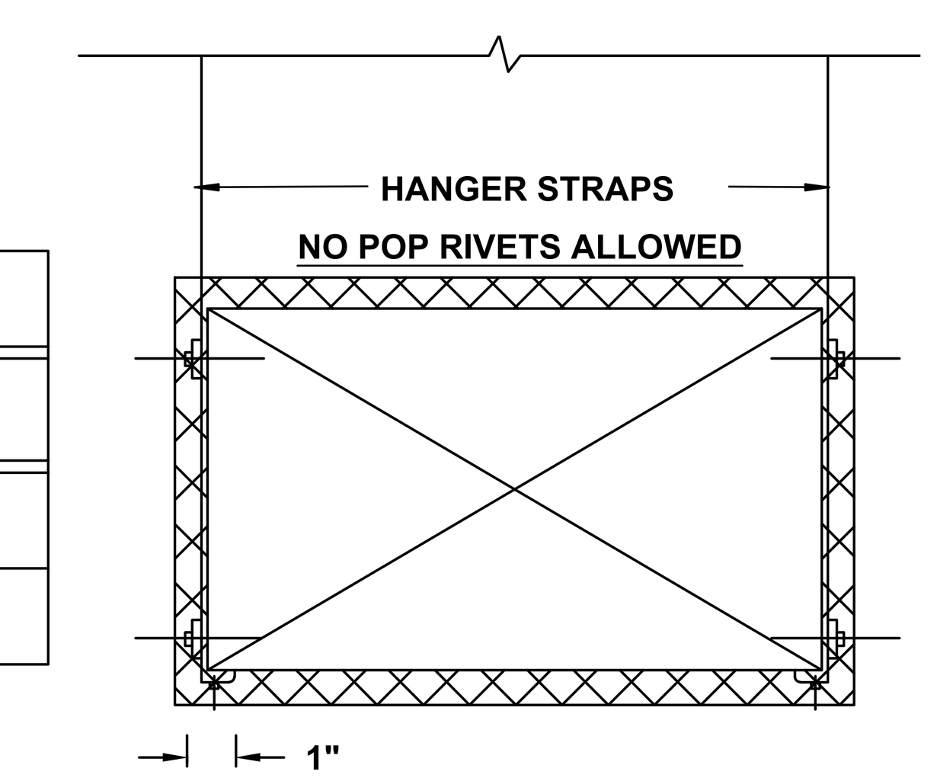
6E DETAIL - TYPICAL INLINE FAN INSTALLATION

NTS

NO. 10x3/4" SELF TAPPING CADMIUM PLATED SHEET METAL SCREWS TO ANCHOR STRAPS TO DUCT AND JOISTS. ALL STRAPS SHALL BE TIGHT AGAINST DUCT AND MEMBERS.

HANGER SIZES FOR RECTANGULAR DUCT

MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
UP TO 34"	1" X 18 GAGE STRAP	NONE REQUIRED	8'-0"
34" TO 40"	1" X 18 GAUGE STRAP	NONE REQUIRED	6'-0"



3E DETAIL - DUCT STRAP HANGER

NTS

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Drawing Title: **MECHANICAL DETAILS**

Approved: Chief of Facility Management Svc.

Approved: Medical Center Director

Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**

Building Number: 2 | Checked: CMD | Drawn: JDG

Location: SALEM VA MEDICAL CENTER

Date: 2018.02.16

Project No.: 658-315

Drawing No.: **MH502**

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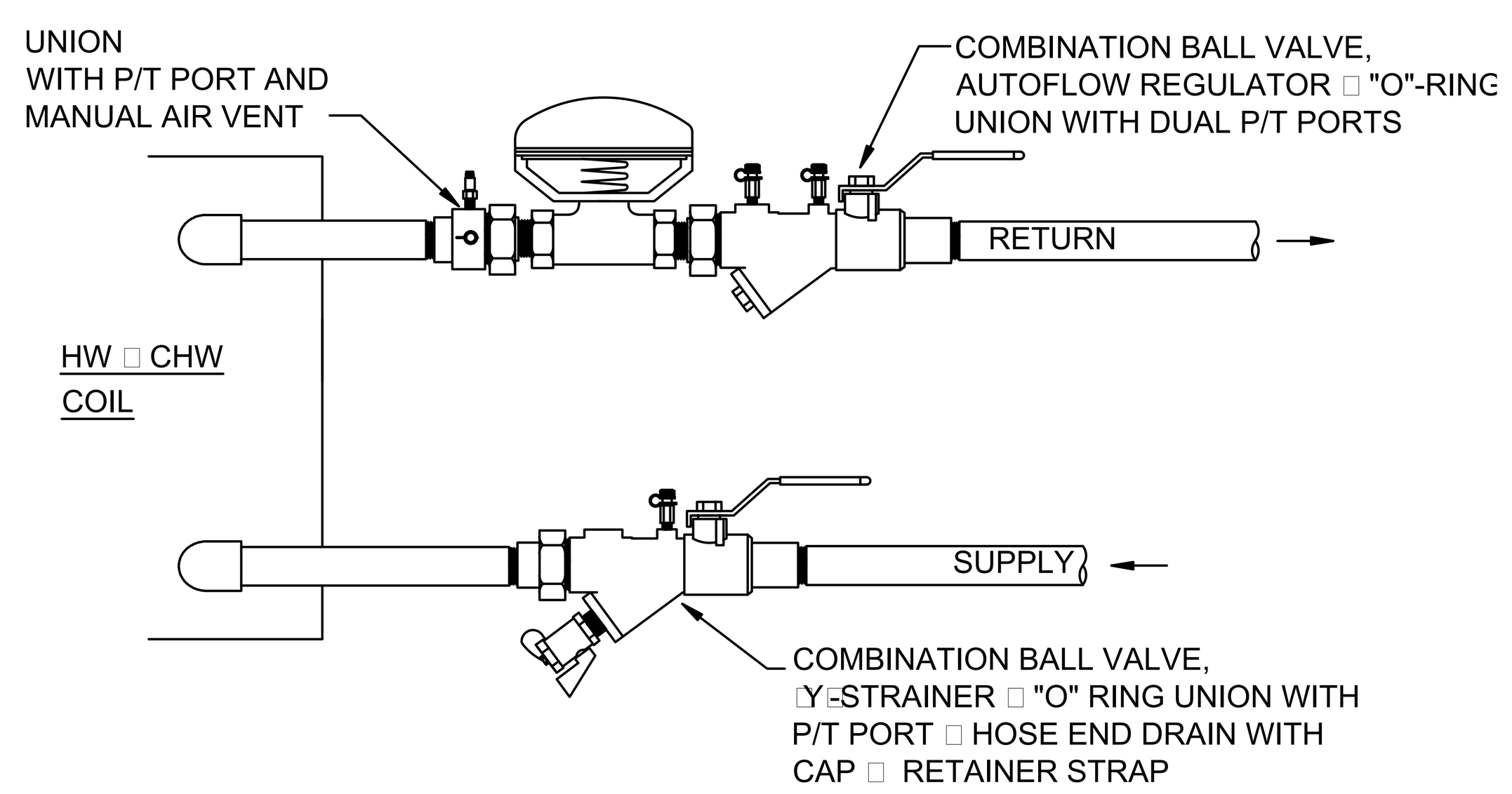
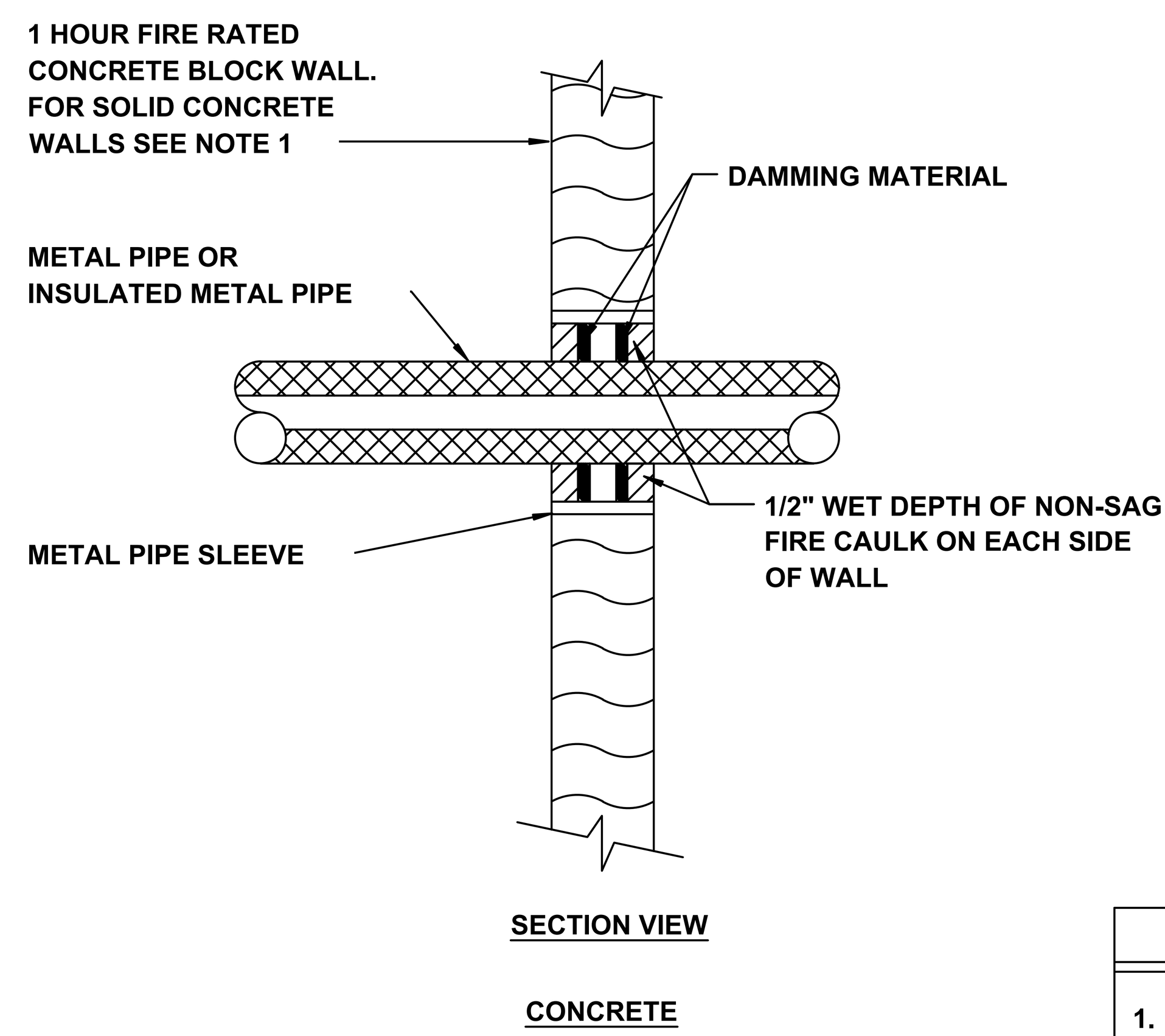


9B VAV BOX AND FCU TWO-WAY COIL
NTS



A) FOR UNINSULATED METAL PIPE:

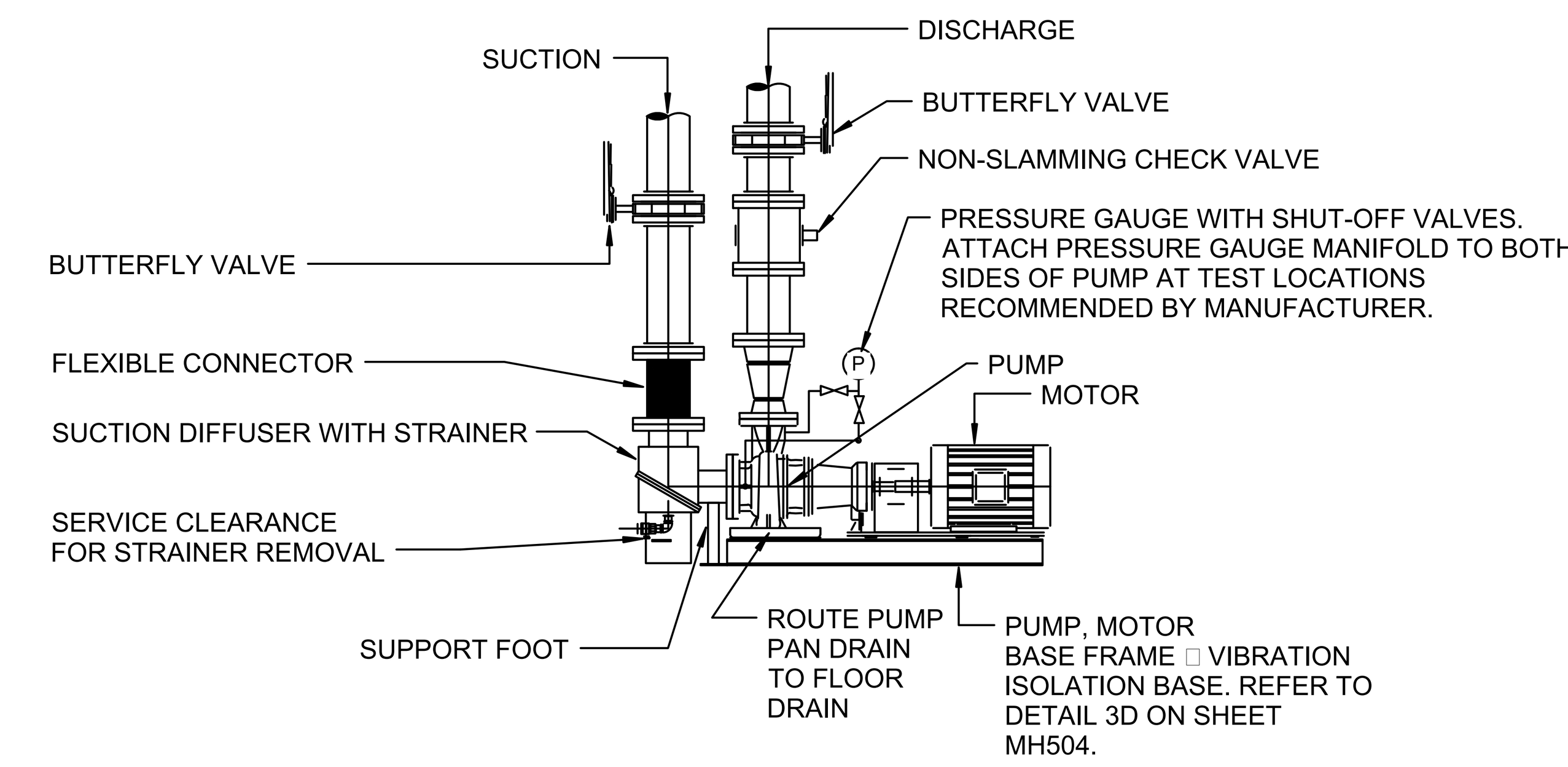
1. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEM 49.
2. UP TO 40% SHRINKAGE OF NON-SAG OR SELF-LEVELING FIRE CAULK IS ACCEPTABLE AFTER INITIAL WET DEPTH INSTALLATIO
3. MAXIMUM ANNULAR SPACE TO BE FILLED IS 2-1/2"

B) FOR INSULATED METAL PIPE:

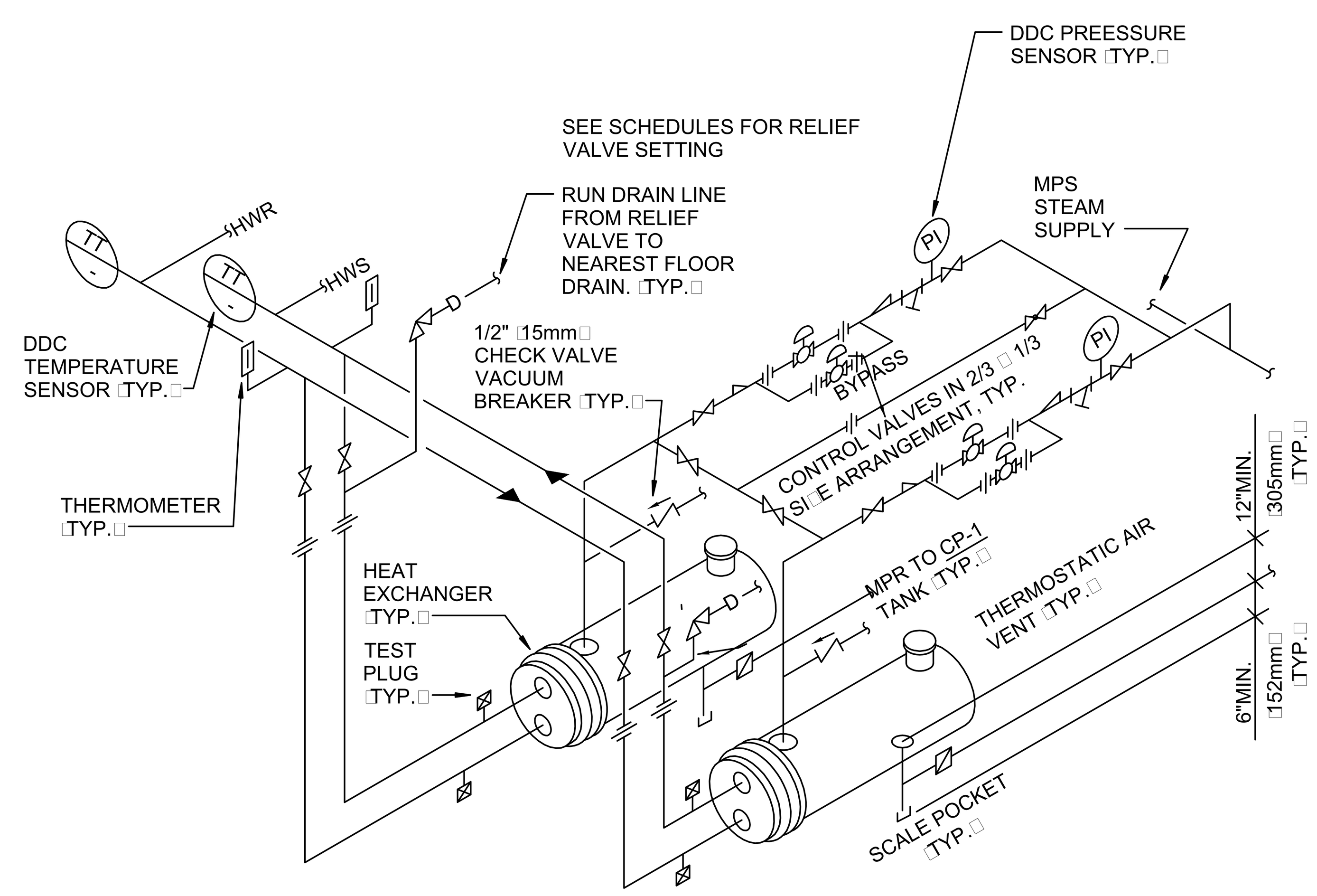
1. DEPTH OF FIRE CAULK DEPENDS ON INSULATION THICKNESS: 1" OF INSULATION - 1" DEPTH OF FIRE CAULK 2"-3" OF INSULATION - 2" DEPTH OF FIRE CAULK
2. MINIMUM ANNULAR SPACE TO BE FILLED IS 3/4". MAXIMUM ANNULAR SPACE TO BE FILLED IS 2-1/2"
3. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) TIME TEMPERATURE CURVE FIRE EXPOSURE. UL CLASSIFIED PER SYSTEM 91
4. IT IS NOT NECESSARY TO REMOVE INSULATION AS IT PENETRATES THE WALL OR FLOOR.

NOTES
1. FOR SOLID CONCRETE WALLS, CENTER NON-SAG FIRE CAULK WITHIN WALL WITH DAMMING MATERIAL ON ONE SIDE.

6B DETAIL - FIRE RATED PIPING PENETRATION
NTS

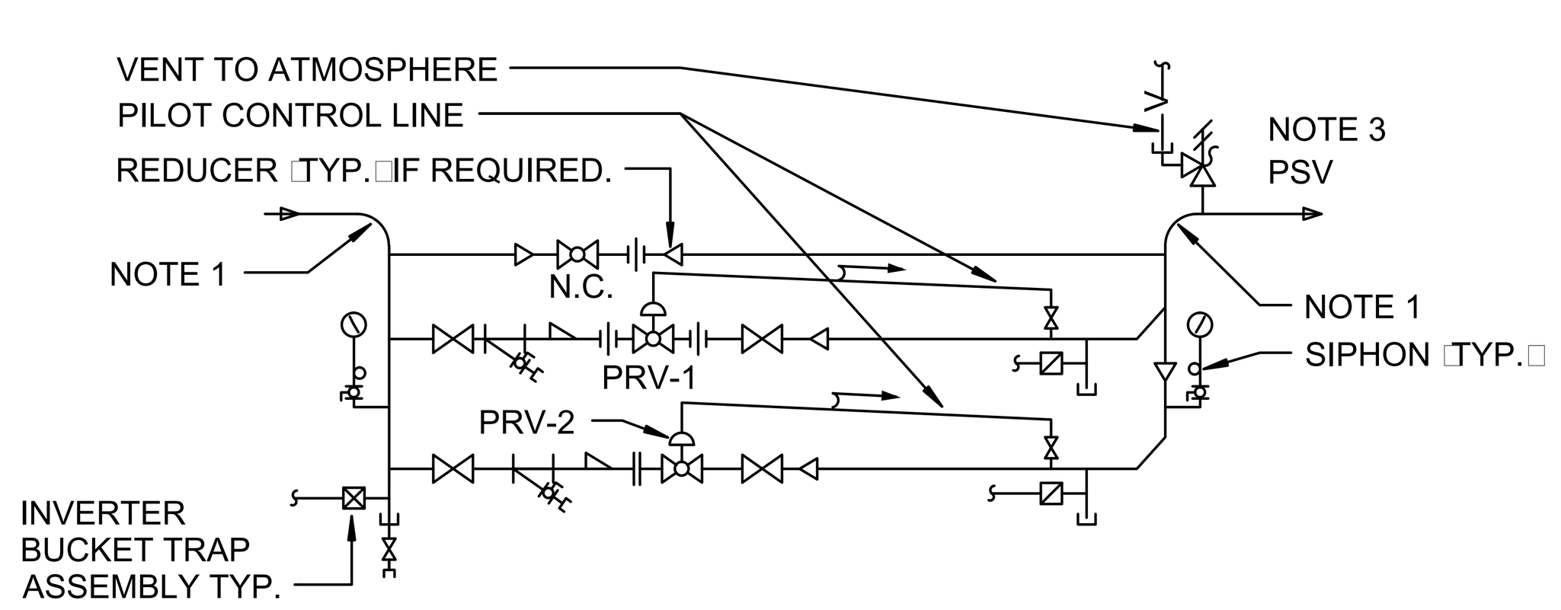


3B DETAIL - BASE MOUNTED END SUCTION PUMP
NTS



NOTE:

1. THE ABOVE DETAIL SHOWS REQUIRED PIPING FOR TWO HEAT EXCHANGERS IN PARALLEL.
2. PROVIDE SADDLE SUPPORTS AND LEGS OR HANGERS FOR HEAT EXCHANGER. MOUNTING HEIGHT SHALL BE ADJUSTED TO FACILITATE GRAVITY RETURN OF STEAM CONDENSATE.
3. MAKE THE BYPASS THE SAME SI□E AS THE CONNECTIONS TO THE CONTROL VALVES.
4. CONTROL VALVES SHALL BE IN A 1/3 AND 2/3 SI□E ARRANGEMENT.



NOTE:

1. SEE FLOOR PLANS FOR PIPE SI□ES.
2. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.
3. MAKE BYPASS VALVE DISCHARGE PIPE THE SAME SI□E AS THE LOWER VALVE PIPING FOR THE LARGEST PRV.
4. PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.
5. SET PRV-1 FOR 10 PSI AND PRV-2 FOR 2 PERCENT HIGHER.

9F DETAIL - STEAM PRESSURE REDUCING STATION DBL VALVE
NTS

6F DETAIL - HEAT EXCHANGER STEAM TO HOT WATER
NTS

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Approved: Medical Center Director

Drawing Title: MECHANICAL DETAILS
Project Title: RELOCATE AND EXPAND RENAL DIALYSIS
Building Number: 2 | Checked: CMD | Drawn: JDG
Location: SALEM VA MEDICAL CENTER
Date: 2018.02.16
Project No.: 658-315
Drawing No.: MH503
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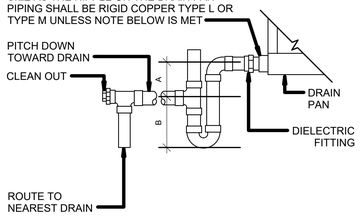


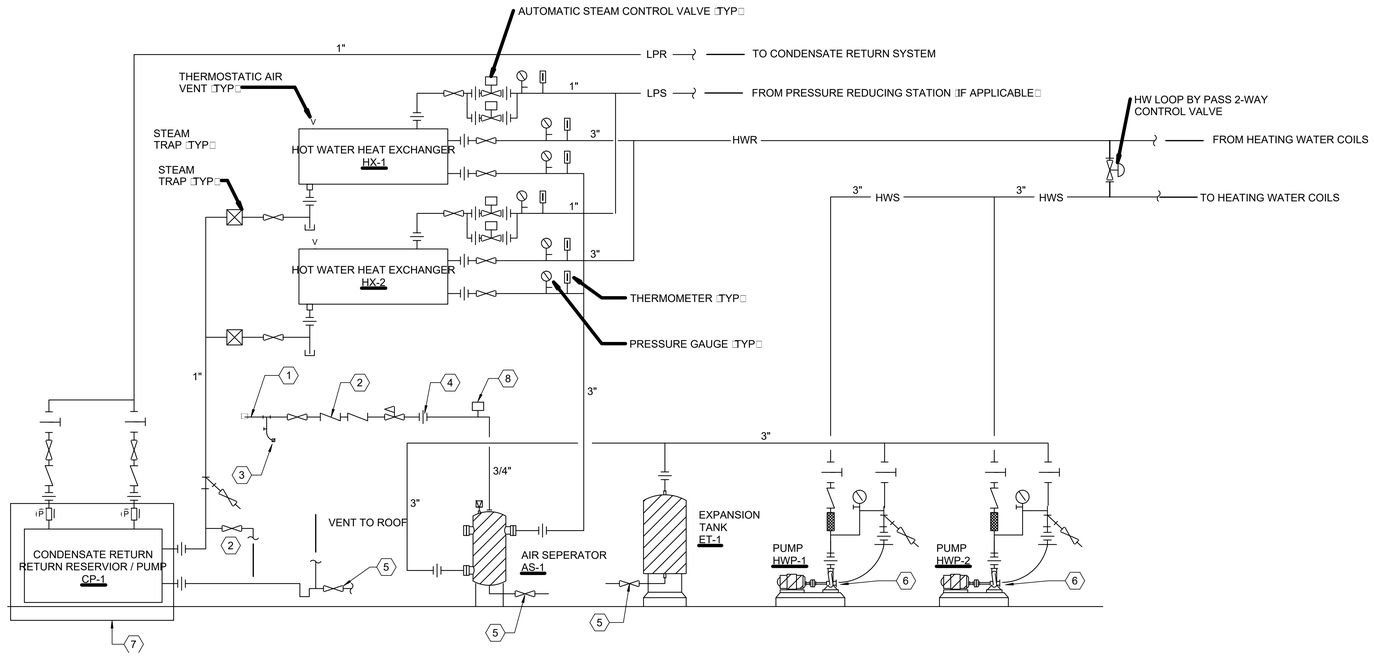
NOTE:

1. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

UNIT TYPE	A	B
DRAW THRU	2"□50mm□ PLUS X	X
BLOW THRU	1"□25mm□ MINIMUM	2X

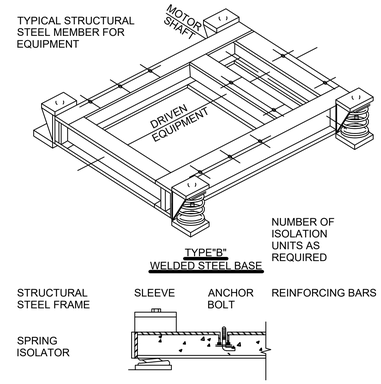
WHERE X = STATIC PRESSURE IN PAN

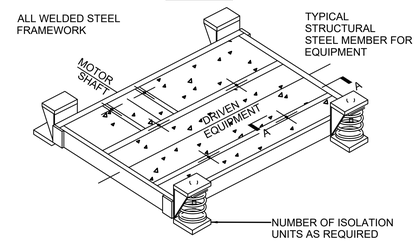
8B DETAIL - AIR HANDLING UNIT DRAIN TRAP
NTS



8F DETAIL - STEAM TO HX
NTS

NOTES
1. MAKE-UP WATER PIPING
2. APPROVED BACKFLOW PREVENTOR
3. 3/4" HOSE BIBB WITH VACUUM BREAKER
4. PRESSURE REDUCING VALVE SET at 12 PSI
5. DRAIN VALVE
6. PUMP INLET DIFFUSER
7. DASHED LINE INDICATES CONDENSATE RETURN PUMP PACKAGE
8. MAKE -UP WATER FLOW SENSOR TO DDC





NOTE:
ISOLATION BASE INSTALLATIONS TYPICAL FOR BASE MOUNTED HW AND CHW PUMPS

3F DETAIL - VIBRATION ISOLATION BASES
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Drawing Title: **MECHANICAL DETAILS**
Approved: Chief of Facility Management Svc.
Approved: Medical Center Director

Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**
Building Number: 2 | Checked: CMD | Drawn: JDG
Location: SALEM VA MEDICAL CENTER

Date: 2018.02.16
Project No.: 658-315
Drawing No.: **MH504**
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SALEM RENAL DIALYSIS HVAC AIRFLOW ANALYSIS							
VA DESIGN MANUAL CALCULATONS							
Unit #	Room Name	Air Changes Req'd	OA Changes Req'd	% OA REQ'D	OA REQ'D CFM	AIRFLOW CFM	Room Pressure
AHU-1							
	Dialysis	6	2	33□	630	1865	□o□
	Dialysis Corridor	4	2	50□	535	1070	□□□
	Nurse Station	6	2	33□	225	675	□o□
	Nourish Alcove	6	2	33□	45	130	□o□
	Dialysis Toilet	10	0	0□	0	155	□--□
	Exam/Treat	6	2	33□	60	180	□o□
	Med Prep	6	2	33□	60	180	□□□
	Isolation Room	12	2	17□	75	450	□-□
	Private Room	6	2	33□	80	240	□o□
	Equipment Storage	4	4	100□	100	100	□o□
	Corridor CB-3	4	2	50□	410	825	□□□
	Clean Linen	4	0	0□	0	60	□o□
	Toilet	10	0	0□	0	165	□--□
	Toilet	10	0	0□	0	175	□--□
	Chief Office	4	2	50□	55	105	□o□
	Chief Nurse	4	2	50□	50	105	□o□
	Dietician	4	2	50□	55	110	□o□
	Vestibule	0	0	0□	0	0	□□□
	Stairway	0	0	0□	0	0	NA
	Training Room	4	2	50□	60	120	□o□
	Water Treatment	10	10	100□	670	670	□--□
	Biomed Repair	6	2	33□	70	215	□-□
	Dialysate Prep	4	4	100□	130	130	□□□□
	Corridor CB-4	4	2	50□	350	700	□□□
	Elevator Room	0	0	0□	0	0	NA
	Mechanical Room	0	0	0□	0	0	NA
	Electrical Room	0	0	0□	0	0	NA
	Electrical Room	0	0	0□	0	0	NA
	Clean Storage	4	4	100□	190	190	□□□
	Clean Prep	4	4	100□	200	200	□□□□
AHU-E							
	Staff Lockers	6	0	0□	0	150	□-□
	Staff Lounge	4	2	50□	75	150	□-□
	Staff Unisex Tlt 10	10	2	20□	35	185	□--□
	Patient Unixex Tlt 11	10	2	20□	40	200	□--□
	Corridor CB-2B	4	2	50□	150	300	□□□
	Elec Room	0	0	0□	0	0	NA
	Telecom	0	0	0□	0	0	NA
	Teledata	0	0	0□	0	0	NA
	Physician Office	4	2	50□	115	235	□o□
	Waiting	6	2	33□	370	1110	□-□
	Reception	6	2	33□	90	270	□-□
	Soiled Rec	6	0	0□	0	205	□-□
	Soiled Utility	6	0	0□	0	145	□-□
	Corridor CB-9	4	2	50□	65	135	□□□
	Util, Sterile, Clean	4	4	100□	410	410	□□□

8F **MECHANICAL AIR FLOW**
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Drawing Title: MECHANICAL FLOW CONTROL DIAGRAMS
Project Title: RELOCATE AND EXPAND RENAL DIALYSIS
Date: 2018.02.16
Project No.: 658-315
Building Number: 2
Checked: CMD
Drawn: JDG
Drawing No.: MH601
Location: SALEM VA MEDICAL CENTER
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VAV TERMINAL UNITS (TYPICAL)

GENERAL:
EACH TERMINAL UNIT SHALL BE PROVIDED WITH APPLICATION SPECIFIC CONTROL MODULE □ASC□ UNIT AIRFLOW SHALL BE MONITORED BY AN INTEGRAL, MULTI-POINT, AVERAGING FLOW SENSING DEVICE AND TRANSDUCER TO MAINTAIN AIRFLOW WITHIN 5□ OF THE RATED CFM DOWN TO A MINIMUM CFM AS SCHEDULED, INDEPENDENT OF CHANGES IN SYSTEM STATIC PRESSURE.

OCCUPIED COOLING CYCLE:
UPON A RISE IN SPACE TEMPERATURE ABOVE COOLING SETPOINT, THE TERMINAL UNIT SHALL MODULATE THE PRIMARY AIR VALVE BETWEEN THE MINIMUM AND MAXIMUM AIR FLOW RATES SCHEDULED TO MAINTAIN SPACE TEMPERATURE SETPOINT.

OCCUPIED HEATING CYCLE:
IF THE TERMINAL UNITS AIR DAMPER IS IN THE MINIMUM POSITION AND THE SPACE TEMEPERATURE CONTINUES TO FALL BELOW THE SPACE TEMPERATURE SET POINT, THEN THE TERMINAL UNIT HEATING WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE SETPOINT. WHEN IN HEATING MODE THE AIR TERMINAL UNIT SHALL REMAIN AT MINIMUM AIR FLOW RATE □CFM□AS SCHEDULED.

UNOCCUPIED CYCLE:

IN ORDER TO MAINTAIN BUILDING PRESSURI□ATION, THE AHU□S AND VAV AIR TERMINAL UNITS WILL OPERATE IN A SIMILAR MANNER AS THE OCCUPIED MODE. HOWEVER, DURING THE UNOCCUPIED MODE SETBACK SPACE TEMPERATURE SETPOINTS WILL BE USED.

VAV AIR HANDING UNIT WITH STATIC PRESSURE OPTIMIZATION (AHU-1):

OCCUPIED MODE:

COOLING:
WHEN THE AHU IS IN THE OCCUPIED COOLING MODE, THE SUPPLY FAN WILL OPERATE CONTINUOUSLY, THE VFD WILL MODULATE TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT □AS DETERMINED BY TAB□, AND THE COOLING VALVE WILL MODULATE IN SEQUENCE TO MAINTAIN A CONSTANT DISCHARGE AIR TEMPERATURE OF 55 F □ADJ□

HEATING:
WHEN THE AHU IS IN THE OCCUPIED HEATING MODE, THE SUPPLY FAN WILL OPERATE CONTINUOUSLY, THE VFD WILL MODULATE TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT □AS DETERMINED BY TAB□, AND THE PRE-HEAT VALVE WILL MODULATE IN SEQUENCE TO MAINTAIN A CONSTANT DISCHARGE AIR TEMPERATURE 52 F □ADJ□ THE OA DAMPER SHALL BE SET TO THE MINIMUM POSITION REQUIRED FOR SPACE VENTILATION. THE AIR SIDE ECOMONI□ER MODE SHALL BE LOCKED OUT ANYTIME THE UNIT IS IN HEATING MODE.

UNOCCUPIED MODE:
IN ORDER TO MAINTAIN BUILDING PRESSURI□ATION, THE AHU□S AND VAV AIR TERMINAL UNITS WILL OPERATE IN A SIMILAR MANNER AS THE OCCUPIED MODE. HOWEVER, DURING THE UNOCCUPIED MODE SETBACK SPACE TEMPERATURE SETPOINTS WILL BE USED.

WARM UP AND COOL DOWN MODE:
THE DDC SYSTEM SHALL HAVE AN ALGORITHM TO ADJUST MORNING WARM-UP/COOL-DOWN SCHEDULE TO ENSURE THE SPACE TEMPERATURE SETPOINTS ARE ACHIEVED PRIOR TO THE BUILDINGS OCCUPANCY SCHEDULE. MORNING WARM-UP/COOL-DOWN SHALL BE SCHEDULED NO LESS THAN 1 HOUR □ADJ.□PRIOR TO OCCUPANCY. THE THE DDC SHALL ENERGI□E THE WATER LOOP SYSTEMS TO MAINTAIN THE SPACE TEMPERATURE SET-POINTS .

SUPPLY FAN CONTROL:
THE SUPPLY FAN WILL OPERATE CONTINUOUSLY DURING OCCUPIED AND UNOCCUPIED MODES UNLESS THE STOP/AUTO INTERLOCK IS OPEN, SMOKE DETECTION, THE MIXED AIR LOW LIMIT TRIPPED, OR THE SUPPLY FAN STATUS INDICATES A FAILURE □AFTER A TWO MINUTE DELAY□ THE LOW LIMIT, SMOKE DETECTION AND THE FAN FAILURE REQUIRE A MANUAL RESET.

VFD CONTROL:
WHEN THE SUPPLY FAN IS ON, THE VFD WILL SLOWLY RAMP □ADJUSTABLE□UP TO SETPOINT AND MODULATE TO MAINTAIN THE PROPER DUCT STATIC PRESSURE SET POINT AS MEASURED BY A STATIC PRESSURE SENSORS LOCATED AT THE MID-POINTS OF THE MEDIUM PRESSURE DUCT LOOP. THE FAN SPEED SHALL BE SET WITH WITH A HIGH STATIC LIMIT □3.75" IN W.C□AND IF THE FAN EXCEEDS THE HIGH STATIC LIMIT AN ALARM SHALL BE SENT TO THE DDC. IF THE STATIC PRESSURE ACROSS THE FAN EXCEEDS THE HIGH STATIC SHUTDOWN LIMIT □4 IN W.C.□THEN THE FAN SHALL BE DE-ENERGI□ED AND ALARM SENT TO THE DDC. THE VFD □VARIABLE FREQUENCY DRIVE□WILL BE OFF IF THE SUPPLY FAN IS OFF OR THE DUCT STATIC PRESSURE SENSOR FAILS.

DUCT STATIC PRESSURE OPTIMI□ATION:
THE DUCT STATIC PRESSURE SETPOINT SHALL BE RESET USING TRIM □ RESPOND LOGIC WITHIN THE RANGE 0.15 IN. W.G. TO 1.3 IN. W.G. □35 PA TO 325 PA□ WHEN THE FAN IS OFF, THE SETPOINT SHALL BE 0.5 IN. W.G. □125 PA□ WHILE THE FAN IS PROVEN ON, EVERY TWO MINUTES, TRIM THE SETPOINT BY 0.04 IN. W.G. □10 PA□IF THERE ARE TWO OR FEWER □ONE PRESSURE REQUESTS. IF THERE ARE MORE THAN TWO □ONE PRESSURE REQUESTS, RESPOND BY INCREASING THE SETPOINT BY 0.06 IN. W.G. □15 PA□ A □ONE PRESSURE REQUEST IS GENERATED WHEN THE VAV DAMPER IS GREATER THAN 95□ OPEN UNTIL IT DROPS TO 80□ OPEN.

COOLING VALVE CONTROL:
THE COOLING VALVE WILL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE DISCHARGE COOLING SETPOINT OF 55°F (ADJUSTABLE). THE COOLING VALVE WILL BE CLOSED IF THE THE SUPPLY FAN IS OFF,OR THE DISCHARGE AIR SENSOR HAS FAILED.

SMOKE DETECTION MODE:
WHEN SMOKE IS DETECTED AND FIRE ALARM SYSTEM ACTIVATED, THE BUILDING DDC SHALL INSTRUCT THE AHU TO STOP THE FAN, CLOSE THE CHW □ HW CONTROL VALVES, AND CLOSE THE OA □ RA DAMPERS.

COOLING COIL FREE□E PROTECTION:
THE DDC SYSTEM SHALL CLOSE THE OA DAMPER ANYTIME THE COOLING COIL ENTERING AIR TEMPERAURE FALLS BELOW 40 F FOR LONGER THAN 5 MINUTES. THE LOW LIMIT FREE□E STAT SHALL STOP THE AHU FAN ANYTIME THE COOLING COIL ENTERING AIR TEMPERATURE FALLS BELOW 35 F. DURING LOW LIMIT FREE□E STAT CONDITION THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE OPENED TO ALLOW CIRCULATION OF WATER TO PREVENT COIL FREE□E.

OUTSIDE AIR CONTROL:
THE DDC SYSTEM, WITH DUCT MOUNTED AIR FLOW MEASURING STATIONS □AFMS□, SHALL MODULATE THE RA AND OA DAMPERS AS REQUIRED TO MAINTAIN THE OA FLOW RATE CFM SCHEDULED. READOUT OF THE OA AIRFLOW RATE SHALL BE IN CFM. UPON FAILURE THE OA DAMPER SHALL BE NORMALLY CLOSED.

AIR SIDE ECONOMI□ER:
THE OA DAMPER SHALL MODULATE BETWEEN THE MINIMUM POSITION REQUIRED FOR SPACE VENTILATION TO FULLY OPEN PROVIDING 100□ OA IN ORDER TO MAINTAIN THE AHU SUPPLY AIR TEMPERATURE SETPOINT. THE AIR SIDE ECONOMI□ER SHALL BE ENABLED ANYTIME THE AMBIENT DRY BULB AIR TEMPERATURE IS BELOW 55 F AND THE AHU IS CALLING FOR COOLING. THE AHU RA DAMPER SHALL BE LINKED WITH THE OA DAMPER OPERATION. THE OA DAMPER SHALL MODULATE TO PROVIDE ALL OR SOME PORTION OF THE COOLING CAPACITY REQUIRED BY THE AIR HANDLING UNIT DURING COOLING MODE.

GENERAL EXHAUST SYSTEMS

EXHAUST FANS □EF-1, -2, -3, -4, -5□

A. EXHAUST FAN SHALL OPERATE CONTINUOUSLY 24 HR/7 DAY/WEEK.

ISOLATION ROOM SYSTEM

THE HVAC SYSTEMS SERVING THE ISOLATION ROOM SHALL OPERATE CONTINUOUSLY 24 HR/7 DAY/WEEK.

A SPACE PRESSURI□ATION MONITOR PANEL □SPM□WILL MONITOR AND CONTROL THE SPACE PRESSURI□ATION LEVEL AS COMPARED WITH THE DIALYSIS STATION OPEN BAY AREA. THE SPM SHALL HAVE A 2-POSITION KEY SWITCH THAT ALLOWS LOCAL CONTROL FOR SETTING THE ISOLATION ROOM TO BE MAINTAINED AT EITHER NEGATIVE OR NEUTRAL PRESSURE. THE SPM SHALL MODULATE THE CONSTANT VOLUME SUPPLY AIR TERMINAL BOX AND THE PATIENT ROOM EXHAUST AIR DAMPER TO MAINTAIN AIRFLOW DIFFERENTIAL BASED ON THE MODE OF OPERATION □NEGATIVE OR NUETRAL□ THE SPM SHALL REPORT SPACE PRESSURE DIFFERENATIAL READINGS AND SETPOINT VALUES TO THE DDC SYSTEM AND A REMOTE PANEL MONITOR □RPM□LOCATED AT THE NURSE STATION. WHEN THE SPACE PRESURI□ATION IS OUT OF RANGE A LOCAL AUDIBLE AND VISUAL ALARM WILL BE INITIATED AT THE SPM, THE RPM AND A ALARM SIGNAL WILL BE SENT TO THE DDC SYSTEM.

THE SUPPLY AIR TERMINAL UNIT REHEAT WILL MODULATE TO MAINTAIN ROOM TEMPERATURE SETPOINT.

CHILLED WATER SYSTEM (CHWP-1 & CHWP-2)

GENERAL:
THE CHILLED WATER LOOP SYSTEM IS A VARIABLE FLOW, BUILDING TERTIARY LOOP TYPE. THE CHILLED WATER IS SUPPLED FROM A CAMPUS CHILLED WATER LOOP PROVIDED FROM OFFSITE CENTRAL ENERGY PLANT. THE CHILLED WATER LOOP SYSTEM CONSISTS OF □2□CHILLED WATER PUMPS, □2□PUMP MOTOR VFD□S, ASSOCIATED CONTROLS AND VALVES. EACH CHILLED WATER PUMP IS SI□ED TO PROVIDE 100□ OF THE REQUIRED CHILLED WATER WATER FLOW RATE INCLUDING ADDITIONAL FLOORS □2-4□PLANNED FOR CONSTRUCTION IN THE FUTURE.

CHILLED WATER □CHWP-1 □ CHWP-2□
STARTING AND STOPPING OF THE CHILLED WATER PUMP SHALL BE ACCOMPLISHED WITH A VFD. PROVIDE CHILLED WATER PUMP WITH A HAND-OFF-AUTO SWITCH. IN THE "HAND" POSITION, THE PUMP SHALL BE CONTROLLED MANUALLY. IN THE "AUTO" POSITION THE PUMP SHALL BE CONTROLLED BY THE DDC SYSTEM. THE DDC SYSTEM SHALL START THE MAIN CHILLED WATER PUMP ANY TIME THE AHU OR FAN COIL UNIT IS CALLING FOR COOLING. UPON CALL FOR COOLING THE DECOUPLER VALVE □NORMALLY CLOSED□SHALL MODULATE OPEN TO MAINTAIN THE PRIMARY CHWS LOOP TEMPERATURE OF 42 F □ADJ□

THE CHILLED WATER PUMPS SHALL BE OPERATE IN A MAIN / STAND-BY CONFIGURATION TO ENSURE EQUAL PUMP RUN TIME. THE ALTERNATION FUNCTION REVERSES THE OPERATION OF THE PUMPS. UPON ALTERNATION THE MAIN PUMP SHALL ROTATE TO STAND-BY AND THE STAND-BY PUMP SHALL ROTAE TO THE MAIN POSITION. THE ALTERNATION FUNCTION SHALL BE PROGRAMMED TO OCCUR ANYTIME THE ACTIVE MAIN PUMP COMES TO REST.

DIFFERENTIAL PRESSURE CONTROL:
THE OBJECTIVE FOR THE CHILLED WATER PUMP OPERATIONS IS TO ALWAYS HAVE THE PUMP OPERATE AT THE LOWEST SPEED AND PRESSURE POSSIBLE TO SATISFY THE BUILDING LOAD. THE LOOP DIFFERENTIAL SETPOINT WILL BE MAINTAINED AT THE PRESSURE SETPOINT REQUIRED TO PROVIDE FULL FLOW TO ALL CONTROL VALVES SIMULTANEOUSLY □PER TAB REPORT□

HOWEVER, IF THE PUMP VFD HAS BEEN RESET TO THE MINIMUM SPEED ALLOWABLE □TAB VERIFY□AND THE LOOP DIFFERENTIAL PRESSURE CONTINUES TO RISE ABOVE THE MAXIMUM PRESSURE SETPOINT. THEN THE LOOP BYPASS VALVE SHALL OPEN TO MAINTAIN THE DIFFERENTIAL SETPOINT AND THE MINIMUM PUMP SPEED □15H□□

HOT WATER LOOP SYSTEM (HX-1, HX-2, HWP-1 & HWP-2):

GENERAL:
THE HOT WATER LOOP SYSTEM IS A PRIMARY LOOP SERVING THE AHU AND AIR TERMINAL UNIT REHEAT COILS. THE HOT WATER LOOP SYSTEM IS ENABLED YEAR ROUND AND WILL START UPON A CALL FOR HEATING FROM THE AHU OR FAN COIL UNITS BY THE DDC SYSTEM. THE HOT WATER LOOP SYSTEM EQUIPMENT CONSISTS OF □2□PUMPS, □2□PUMP MOTOR VFD□S □2□HEAT EXCHANGERS, ASSOCIATED CONTROLS AND VALVES. EACH HEAT EXCHANGER IS SI□ED TO PROVIDE 115□ CAPACITY OF THE BUILDING□S HEATING LOAD INCLUDING ADDITIONAL FLOORS □2-4□PLANNED FOR CONSTRUCTION IN THE FUTURE. EACH HOT WATER PUMP IS SI□ED TO PROVIDE 100□ OF THE REQUIRED HEATING HOT WATER WATER FLOW RATE INCLUDING ADDITIONAL FLOORS □2-4□PLANNED FOR CONSTRUCTION IN THE FUTURE.

STEAM TO HOT WATER HEAT EXCHANGER □HX-1 □ HX-2□
THE HEAT EXCHANGER SHALL BE PROVIDED WITH A 1/3 STEAM VALVE AND 2/3 STEAM VALVE FOR ACCURATE CONTROL OF HOT WATER TEMPERATURE. THE 1/3 STEAM VALVE SHALL MODULATE MAINTAIN HOT WATER TEMPERATURE DURING A LOW HEATING LOADS. ONCE THE 1/3 STEAM VALVE IS FULLY OPEN AND THE HOT WATER TEMPERATURE CONTINUES TO DROP THEN THE 2/3 STEAM SHALL MODULATE TO MAINTAIN HOT WATER TEMPERATURE SET POINT. THE HEAT EXCHANGER CONTROLS WILL MODULATE THE STEAM VALVES TO MAINTAIN CONSTANT HW LOOP SUPPLY TEMPERATURE OF 160 DEG F □ADJ□

THE HEAT EXCHANGERS SHALL BE OPERATE IN A MAIN / STAND-BY CONFIGURATION TO ENSURE EQUAL OPERATION RUN TIME. THE ALTERNATION FUNCTION REVERSES THE OPERATION OF THE HEAT EXCHANGERS. UPON ALTERNATION THE MAIN EXCHANGER SHALL ROTATE TO STAND-BY AND THE STAND-BY HX SHALL ROTAE TO MAIN POSITION. THE ALTERNATION FUNCTION SHALL BE PROGRAMMED TO OCCUR EVERY A WEEK.

HOT WATER PUMP □HWP-1 □ HWP-2□
STARTING AND STOPPING OF THE HOT WATER PUMP SHALL BE ACCOMPLISHED WITH A VFD. PROVIDE HOT WATER PUMP WITH A HAND-OFF-AUTO SWITCH. IN THE "HAND" POSITION, THE PUMP SHALL BE CONTROLLED MANUALLY. IN THE "AUTO" POSITION THE PUMP SHALL BE CONTROLLED BY THE DDC SYSTEM. THE DDC SYSTEM SHALL START THE HOT WATER PUMP ANY TIME AN AHU OR FCU IS CALLING FOR HEATING.

THE HOT WATER PUMPS SHALL BE OPERATE IN A MAIN / STAND-BY CONFIGURATION TO ENSURE EQUAL PUMP RUN TIME. THE ALTERNATION FUNCTION REVERSES THE OPERATION OF THE PUMPS. UPON ALTERNATION THE MAIN PUMP SHALL ROTATE TO STAND-BY AND THE STAND-BY PUMP SHALL ROTAE TO MAIN POSITION. THE ALTERNATION FUNCTION SHALL BE PROGRAMMED TO OCCUR ANYTIME THE MAIN PUMP COMES TO REST.

HOT WATER RESET:
THE DDC SYSTEM SHALL MODULATE THE LOOP WATER SUPPLY TEMPERATURE SETPOINT TO MATCH A LINEAR RESET SCHEDULE BASED ON THE OUTSIDE AIR TEMPERATURE □OAT=16 DEG F, HWS= 160 DEG F□AND □OAT=60 DEG F, HWS= 140 DEG F□

DIFFERENTIAL PRESSURE CONTROL:
THE OBJECTIVE FOR THE HOT WATER PUMP OPERATIONS IS TO ALWAYS HAVE THE PUMP OPERATE AT THE LOWEST SPEED AND PRESSURE POSSIBLE TO SATISFY THE BUILDING LOAD. THE LOOP DIFFERENTIAL SETPOINT WILL BE MAINTAINED AT THE PRESSURE SETPOINT REQUIRED TO PROVIDE FULL FLOW TO ALL CONTROL VALVES SIMULTANEOUSLY □PER TAB REPORT□

HOWEVER, IF THE PUMP VFD HAS BEEN RESET TO THE MINIMUM SPEED ALLOWABLE □TAB VERIFY□AND THE LOOP DIFFERENTIAL PRESSURE CONTINUES TO RISE ABOVE THE MAXIMUM PRESSURE SETPOINT. THEN THE LOOP BYPASS VALVE SHALL OPEN TO MAINTAIN THE DIFFERENTIAL SETPOINT AND THE MINIMUM PUMP SPEED □15H□□

FAN COIL UNITS:

GENERAL:

THE FAN COIL UNIT □FAN SPEED, COOLING COIL VALVE OPENING, AND HEATING COIL VALVE OPENING□SHALL BE CONTROLLED BY IT□S APPILCATION SPECIFIC CONTROLLER □ASC□ COORDINATE THE FACTORY MOUNTING AND WIRING OF THE ASC WITH THE FAN COIL UNIT MANUFACTURER.

A WALL MOUNTED SPACE TEMPERATURE THERMOSTAT SHALL CONTROL ROOM CONDITIONS THROUGH THE ASC AND ENABLE THE BUILDING OCCUPANTS TO VARY THE SPACE SETPOINT OVER A LIMITED RANGE AS DETERMINED BY THE BUILDING DDC. THE SPACE TEMPERATURE SENSOR SHALL DISPLAY TEMPERATURE SETPOINT AND SPACE TEMPERATURE.

OCCUPIED MODE:

THE FAN COIL UNIT□S SHALL CONTINUOUSLY RUN TO MAINTAIN THE SPACE MINIMUM AIR CHANGE RATE. THE FAN MOTOR SPEED □LOW-MED-HIGH□, CHILLED WATER AND HW HEATING COIL POSITIONS SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE SETPOINTS.

THE FCU□S ASC SHALL MODULATE THE HW □ CHW CONTROL VALVES AND THE THREE-SPEED FAN TO WORK COOPERATIVELY TO MEET CAPACITY REQUIREMENTS WHILE MINIMI□ING FAN SPEED AND WATER VALVE POSITION. WHEN THE FCU IS OPERATING AT LOW FAN SPEED AND THE SPACE LOAD INCREASES, THE WATER VALVE SHALL MODULATE OPEN. ONCE THE FCU□S LOW FAN SPEED CAPACITY IS MEET THE FCU FAN SHALL SWITCH TO MEDIUM FAN SPEED AND THE WATER VALVE SHALL REPOSITION TO MAINTAIN AN EQUIVALENT CAPACITY. SIMILAR FCU OPERATION SHALL OCCUR WHEN INCREASEING FROM MED TO HIGH FAN SPEED. THE REVERSE SEQUENCE TAKES PLACE WITH A DECREASE FCU CAPACITY.

UNOCCUPIED MODE:
THE UNITS SHALL OPERATE CONTINUOUSLY □24 HR/DAY □ 7 DAY/WEEK□ THE FAN COIL UNITS DO NOT HAVE SETBACK TEMPERATURE SETPOINTS.

SMOKE MODE:

THE BUILDING DDC SHALL SIGNAL THE FAN COIL UNIT TO STOP FAN OPERATION AND CLOSE THE CONTROL HW □ CWH VALVES WHEN SMOKE IS DETECTED AND FIRE ALARM SYSTEM IS ACTIVATED.

CONSTRUCTION DOCUMENTS
FULLY SPRINKLERED

Revisions: | Date

BES DESIGN/BUILD
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4-18-17

Approved: Patient Safety Nurse	Approved: Energy Engineer	Approved: Safety Manager	Approved: Service Chief
	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title	MECHANICAL CONTROL SEQUENCES
Approved: Chief of Facility Management Svc.	
Approved: Medical Center Director	
Project Title	RELOCATE AND EXPAND RENAL DIALYSIS
Building Number	2
Checked	CMD
Drawn	CMD
Location	SALEM VA MEDICAL CENTER
Date	2018.02.16
Project No.	658-315
Drawing No.	MH602
Sheet	99 of 120

Veterans Affairs

1/25/2016 12:30:59 PM

AIR HANDLING UNIT SCHEDULE

DESIGNATION	MODEL	ACTUAL SUPPLY AIR FLOW	OUTDOOR AIRFLOW	FAN: EXTERNAL STATIC PRESSURE	FAN: TOTAL STATIC PRESSURE	FAN: SIZE AND TYPE	FAN: MOTOR POWER	FAN: MOTOR VOLTAGE	HEATING COIL: SYSTEM TYPE	HEATING COIL: FACE AREA	HEATING COIL: FACE VELOCITY	HEATING COIL: ROWS	HEATING COIL: ENTERING DRY BULB	HEATING COIL: LEAVING DRY BULB	HEATING COIL: TOTAL CAPACITY	HEATING COIL: ENTERING FLUID	HEATING COIL: LEAVING FLUID	COOLING COIL: SYSTEM TYPE	COOLING COIL: FACE AREA	COOLING COIL: FACE VELOCITY	COOLING COIL: ROWS	COOLING COIL: ENTERING DRY BULB	COOLING COIL: ENTERING WET BULB	COOLING COIL: LEAVING DRY BULB	COOLING COIL: LEAVING WET BULB	COOLING COIL: TOTAL CAPACITY	COOLING COIL: SENSIBLE CAPACITY	COOLING COIL: ENTERING FLUID	COOLING COIL: LEAVING FLUID	SHIPPING WEIGHT	OPERATING WEIGHT
AHU-1	CSIA021	9020 CFM	4040 CFM	3.00 in-wg	5.44 in-wg	18" diameter AF	15 HP	460 V	Hot water	20 SF	440 FPM	1	30 °F	65 °F	340289.0 Btu/h	180 °F	160 °F	Chilled water	20 SF	440 FPM	6	84 °F	71 °F	52 °F	52 °F	542123.3 Btu/h	317450.9 Btu/h	44 °F	56 °F	2.57 kip	2.68 kip

NOTES:
1. PROVIDE FACTORY INSTALLED VARIABLE FREQUENCY DRIVE.
2. PROVIDE AIR HANDLING UNIT WITH A SINGLE POINT POWER CONNECTION.
3. PROVIDE DIRECT DRIVE PLENUM FAN.
4. PROVIDE WITH MERV 8 PREFILTER AND MERV 13 FINAL FILTER WITH DIFFERENTIAL PRESSURE GAUGE.
5. CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE TWO-WAY TYPE. SEE COIL CONNECTION DETAIL 6C ON SHEET MH501.
6. INTERLOCK AHU TO ENABLE FAN SHUTDOWN UPON ACTIVATION OF BLDG FIRE ALARM SYSTEM. REFER TO SEQUENCE OF OPERATIONS .
7. PROVIDE UNIT WITH MAINTENANCE LIGHTS.REFER TO SPECIFICATIONS.
8. PROVIDE UNIT WITH AIRFLOW MEASURING STATION IN OUTSIDE AIR DUCT AS INDICATED ON PLANS.
9. PROVIDE ACCESS SECTIONS WITH HINGED DOORS FOR COIL INSPECTION AND MAINTENANCE.
10. PROVIDE UNIT WITH MIXING BOX COMPLETE WITH LOW LEAKAGE RA AND OA DAMPERS, PRE-HEAT COIL, COOLING COIL, FAN SECTION.
11. PROVIDE UNIT WITH 100% AIR SIDE ECONOMIZER. REFER TO SEQUENCE OF OPERATIONS.
12. PIPE CONDENSATE FROM UNIT DRAINS WITH P-TRAP. PROVIDE CONCRETE PAD AND BASE RAILS OF SUFFICIENT HEIGHT TO ENABLE CORRECT TRAP DEPTH.
13. PROVIDE UNIT WITH CONDENSATE OVERFLOW SHUTOFF SWITCH

LOUVER SCHEDULE

MARK	FLOW	LOUVER HEIGHT	DUCT WIDTH	PRESSURE DROP
L1	1720 CFM	1'-6"	3'-0"	0.10 in-wg
L2	850 CFM	1'-0"	3'-6"	0.10 in-wg
L3	740 CFM	1'-0"	2'-6"	0.10 in-wg

NOTES:
1. PROVIDE WITH VARIABLE FREQUENCY DRIVE.

FAN COIL SCHEDULE

DESIG	SERVICE	FAN DATA: CFM	FAN DATA: ESP (IN)	FAN DATA: BHP	COOLING COIL DATA: TOTAL (MBH)	COOLING COIL DATA: SENS (MBH)	COOLING COIL DATA: EAT DB (°F)	COOLING COIL DATA: EAT WB (°F)	COOLING COIL DATA: EWT DB (°F)	COOLING COIL DATA: GPM @ ΔT= WATER 12°F)	HEATING COIL DATA: TOTAL (MBH)	HEATING COIL DATA: EAT DB (°F)	HEATING COIL DATA: GPM @ ΔT= WATER 20°F)	ELECTRICAL	REMARKS
FCU-1	ELEC RM	700	0.25	0.5	17.3	15.1	75.0	62.4	44	2.9	15.1	65.0	1.5	208/60/1	1
FCU-2	ELEC RM	300	0.25	0.25	7.4	6.5	75.0	62.4	44	1.2	6.5	65.0	0.6	208/60/1	1, 2
FCU-3	TELE DATA RM	800	0.25	0.5	19.8	17.3	75.0	62.4	44	3.3	17.3	65.0	1.7	208/60/1	1, 2
FCU-4	ELEC RM	800	0.25	0.5	19.8	17.3	75.0	62.4	44	3.3	17.3	65.0	1.7	208/60/1	1, 2

NOTES:
1. PROVIDE HIGH SIDEWALL WALL MOUNTED FAN COIL UNIT, TRANE OR EQUAL.
2. PROVIDE CONDENSATE PUMP. BASIS OF DESIGN LIBERTY LCU-20S 115V/1PH/1.5 AMPS.
3. PROVIDE 2-WAY CHILLED WATER AND HOT WATER VALVE CONNECTIONS TYPICAL ALL. SEE TYPICAL COIL CONNECTION DETAIL 9B ON SHEET MH503.

STEAM TO HOT WATER HEAT EXCHANGER SCHEDULE

DESIG	SERVICE	STEAM ENT DB (°F)	FLOW (LB/HR)	INLET PRESSURE (PSI)	TOTAL (MBH)	FLOW (GPM)	EWT DB (°F)	LWT DB (°F)	PUMP	REMARKS
HX-1	HWS/R	249.8	1038	15	1000	100	140	160	HWP-1/2	
HX-2	HWS/R	249.8	1038	15	1000	100	140	160	HWP-1/2	

NOTES:
1. PROVIDE WITH DUPLEX CONDENSATE PUMP, MODEL - WCD12-20B-MA.

PUMP SCHEDULE

DESIG	TYPE	FLOW (GPM)	HP	HEAD (FT)	NPSHR (FT)	ELECTRICAL	BASIS OF DESIGN
CHWP-1	BASE-MOUNT	210.0	5	55.0	6.5	460/3/60	B&G E-1510
CHWP-2	BASE-MOUNT	210.0	5	55.0	6.5	460/3/60	B&G E-1510
HWP-1	BASE-MOUNT	100	5	55.0	4.5	460/3/60	B&G E-1510
HWP-2	BASE-MOUNT	100	5	55.0	4.5	460/3/60	B&G E-1510

NOTES:
1. PROVIDE PUMP MOTORS WITH VARIABLE FREQUENCY DRIVE.

EXPANSION TANK SCHEDULE

Mark	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE FACTOR	BLADDER TYPE	WORKING PRESSURE (PSI)	REMARKS
ET-1	HX-1/2	14.0	0.64	DIAPHRAM	150	

AIR SEPARATOR SCHEDULE

DESIG	SERVICE	FLOW (GPM)	STRAINER FREE AREA (IN^2)	Cv FACTOR	REMARKS
AS-1	HX-1/2	120	66.0	80	

VAV SCHEDULE

Tag	Unit model	Primary inlet	APD @ cooling airflow (in H2O)	Design cooling airflow (cfm)	Min cooling airflow (cfm)	Valve heating airflow (cfm)	Primary EDB (F)	Unit LAT (F)	Heating flow rate (gpm)	Heating ent fluid temp (F)	Coil fluid PD (ft H2O)	GPM
VAV-1-01	VCWF	6"	0.289	270	81	81	55	90	0.66	140	0.83	1 GPM
VAV-1-02	VCWF	6"	0.289	135	41	41	55	90	0.66	140	0.83	1 GPM
VAV-1-03	VCWF	6"	0.289	270	81	81	55	90	0.66	140	0.83	1 GPM
VAV-1-04	VCWF	6"	0.289	270	81	81	55	90	0.66	140	0.83	1 GPM
VAV-1-05	VCWF	6"	0.289	135	41	41	55	90	0.66	140	0.83	1 GPM
VAV-1-06	VCWF	8"	0.289	405	122	122	55	90	0.85	140	0.07	1 GPM
VAV-1-07	VCWF	8"	0.289	405	122	122	55	90	0.85	140	0.07	1 GPM
VAV-1-08	VCWF	8"	0.289	615	185	185	55	90	0.85	140	0.07	1 GPM
VAV-1-09	VCWF	8"	0.289	680	204	204	55	90	0.85	140	0.07	1 GPM
VAV-1-10	VCWF	8"	0.289	535	161	161	55	90	0.85	140	0.07	1 GPM
VAV-1-11	VCWF	8"	0.289	535	161	161	55	90	0.85	140	0.07	1 GPM
VAV-1-12	VCWF	6"	0.289	335	101	101	55	90	0.66	140	0.83	1 GPM
VAV-1-13	VCWF	6"	0.289	280	84	84	55	90	0.66	140	0.83	1 GPM
VAV-1-14	VCWF	6"	0.289	240	72	72	55	90	0.66	140	0.83	1 GPM
VAV-1-15	VCWF	6"	0.289	235	71	71	55	90	0.85	140	0.83	1 GPM
VAV-1-16	VCWF	8"	0.289	670	201	201	55	90	0.85	140	0.07	1 GPM
VAV-1-17	VCWF	10"	0.289	1100	330	330	55	90	0.85	140	0.13	1 GPM
VAV-1-18	VCWF	8"	0.289	700	210	210	55	90	0.85	140	0.07	1 GPM
VAV-1-19	VCWF	8"	0.289	535	161	161	55	90	0.85	140	0.07	1 GPM
VAV-1-20	VCWF	6"	0.289	320	96	96	55	90	0.66	140	0.83	1 GPM
VAV-1-21	VCWF	6"	0.289	350	105	105	55	90	0.66	140	0.83	1 GPM
VAV-E-01	NOT USED											
VAV-E-02	VCWF	8"	0.289	685	206	206	55	90	0.85	140	0.07	1 GPM
VAV-E-03	VCWF	6"	0.289	300	90	90	55	90	0.66	140	0.83	1 GPM
VAV-E-04	VCWF	8"	0.289	380	114	114	55	90	0.85	140	0.07	1 GPM
VAV-E-05	VCWF	8"	0.289	535	161	161	55	90	0.85	140	0.07	1 GPM
VAV-E-06	VCWF	10"	0.289	1110	333	333	55	90	0.85	140	0.13	1 GPM
VAV-E-07	VCWF	6"	0.289	270	81	81	55	90	0.66	140	0.83	1 GPM

NOTES:
1. VAV TERMINAL UNIT CONNECTED TO EXISTING AIR HANDLING UNIT. CONNECT NEW CONTROLS INTO EXISTING LOCAL DDC.
2. PROVIDE WITH TWO-WAY HOT WATER CONTROL VALVES TYPICAL ALL. SEE TYPICAL COIL CONNECTION DETAIL 9B ON SHEET MH503.

AIR DEVICE SCHEDULE

MARK	TYPE	SERVICE	PATTERN	MIN (CFM)	MAX (CFM)	NECK	BLOW	MANUFACTURE'S NUMBERS	Noise Criteria (dB)
D1	T-BAR LAY IN DIFFUSER	SUPPLY	LOUVER FACE	0	150	6"	4 WAY	METALAIRE MODEL "RHD" WITH OBD	≤35
D2	T-BAR LAY IN DIFFUSER	SUPPLY	LOUVER FACE	151	250	8"	4 WAY	METALAIRE MODEL "RHD" WITH OBD	≤35
D3	T-BAR LAY IN DIFFUSER	SUPPLY	LOUVER FACE	251	350	10"	4 WAY	METALAIRE MODEL "RHD" WITH OBD	≤35
E1	T-BAR-LAY IN GRILLE	EXHAUST	EGG CRATE	0	125	6"	N/A	METALAIRE MODEL "CC5"	≤35
E2	T-BAR-LAY IN GRILLE	EXHAUST	EGG CRATE	0	250	12x12	N/A	METALAIRE MODEL "CC5"	≤35
E3	T-BAR-LAY IN GRILLE	EXHAUST	EGG CRATE	0	500	12x12	N/A	METALAIRE MODEL "CC5"	≤35

EXHAUST FAN SCHEDULE

Mark	TYPE	FAN DATA: CFM	FAN DATA: ESP (IN)	FAN DATA: HP	FAN DATA: RPM	SONES	ELECTRICAL	BASIS OF DESIGN	REMARKS
EF-1	INLINE	1410	0.5	1/2	1725	10.0	115/60/1	GREENHECK - SQ-140-A	1,2
EF-2	UPBLAST	960	0.75	1/4	1725	11.5	115/60/1	GREENHECK-CUE-099-A	1,2
EF-3	NOT USED								
EF-4	INLINE	2420	0.75	1.0	1725	12.8	115/60/1	GREENHECK - SQ-140-A	1,2
EF-5	INLINE	1580	0.75	1/2	1725	10.1	115/60/1	GREENHECK - SQ-120-A	1,2
EF-6	INLINE	250	0.5	1/8	1550	8.1	115/60/1	GREENHECK - SQ-95-D	1,2

NOTES:
1. PROVIDE INTERNAL MEANS OF DISCONNECT.
2. PROVIDE GRAVITY BACKDRAFT DAMPER AND WMBS.

CONSTRUCTION DOCUMENTS
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Revisions: | Date

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4-18-17

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	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title: **MECHANICAL SCHEDULES**
Approved: Chief of Facility Management Svc.
Approved: Medical Center Director

Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**
Building Number: 2 | Checked: CMD | Drawn: JDG
Location: SALEM VA MEDICAL CENTER

Date: 2018.02.16
Project No.: 658-315
Drawing No.: **MH603**
Sheet 100 of 120

Veterans Affairs

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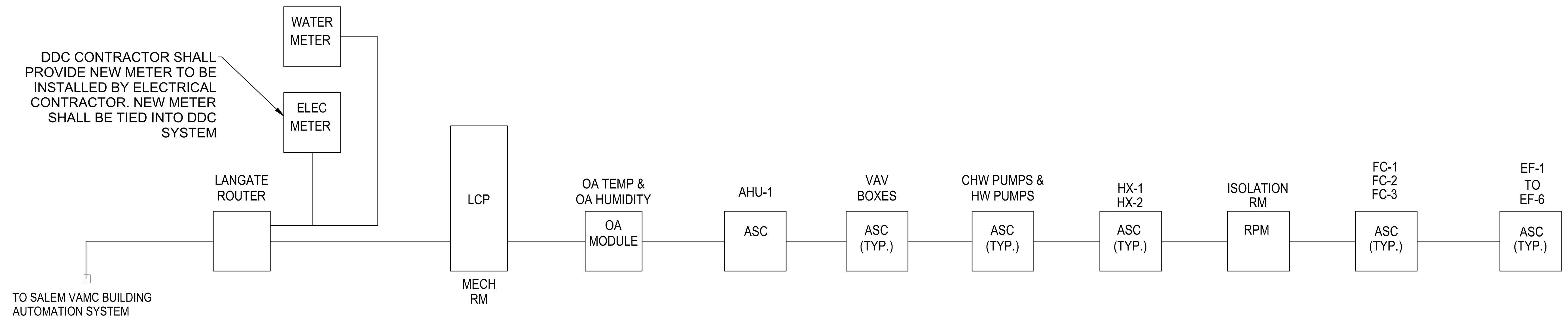


NEW - DDC ARCHITECTURE

GENERAL NOTES:
1. GENERAL NOTES REFERENCE MOST IMPORTANT ASPECTS OF DDC SYSTEM REQUIREMENTS. WHERE GENERAL NOTES FALI TO ADDRESS, REFER TO SPECIFICATION SECTION 23 09 900.
2. IT IS THE DECLARED AND ACKNOWLEDGED INTENTION AND MEANING TO INTEGRATE AND CONNECT NEW DDC CONTROLLERS INTO THE EXISTING SIEMENS DDC SYSTEM. NEW EQUIPMENT SHALL BE COMPATIBLE WITH THE EXISTING BUILDING DDC SYSTEM. PROVIDE THE "SEQUENCE OF OPERATION" AS INDICATED ON THE PLANS. ALL EQUIPMENT BOTH NEW AND EXISTING TO REMAIN FOR USE SHALL BE SERVED BY THE EXISTING BUILDING DDC SYSTEM.
3. THE CONTRACTOR SHALL FURNISH ALL NECESSARY CONTROL PANELS, MODULES AND PERIPHERAL DEVICES TO ACHIEVE A COMPLETE CONTROL OVER THE HVAC SYSTEM.
4. CAREFULLY REMOVE WITHOUT DAMAGE, EXISTING CONTROLS NOT USED IN NEW WORK, PACKAGE AND DELIVER TO THE GOVERNMENT WHERE DIRECTED BY THE OWNER NOT MORE THAN 5 MILES FROM PROJECT SITE.
5. ALL EXISTING SYSTEMS SHALL REMAIN OPERATIONAL AND IN SERVICE DURING CONSTRUCTION.
6. THE EXISTING SIEMENS CONTROL SYSTEM BACKBONE SHALL BE EXTENDED WHERE REQUIRED FOR NEW WORK COMPLETION.\N7. WALL MOUNTED LOCAL CONTROL (LCP) SHALL BE PROVIDED IN THE MECHANICAL ROOM. LCP SHALL BE APPLICATION SPECIFIC CONTROLLERS. ALL LCP'S SHALL PROVIDE A LOCAL CONNECTION PORT TO ATTACH LOCALLY THE BUILDING CONTROL NETWORK VIA ETHERNET CABLE CONNECTION.
8. ALL APPLICATION SPECIFIC CONTROLLERS (ASC'S) SHALL HAVE FIXED FACTORY APPLICATION PROGRAM WITH CONFIGURABLE SETTINGS. ALL ASC'S SHALL BE ABLE TO COMMUNICATE DIRECTLY TO THE BUILDING CONTROL NETWORK.
9. THE CONTROLS CONTRACTOR SHALL PROVIDE ALL NECESARY PROVISIONS AND APPURTENANCES TO INTEGRATE THE DDC SYSTEM IN THE EXISTING BUILDING AUTOMATION SYSTEM (BAS).
10. UPDATE THE BAS GRAPHICS INDICATING NEW EQUIPMENT I CONTROL POINTS.

	SYSTEM POINT SCHEDULE												INPUTS																																		OUTPUTS																				NOTE
	SOFTWARE												HARDWARE																																		HARDWARE																				
	CONTROL PROGRAM FUNCTION												ANALOG																								DIGITAL									ANALOG																DIGITAL				
	GRAPHIC DISPLAY	GRAPHIC PROGRAMMING	TIME SCHEDULING	OPTIMUM START	LOCAL STATUS ALARM	RUNTIME LOGGING	ALARM REPORTS						RETURN AIR TEMP SENSOR	OUTSIDE AIR RELATIVE HUMIDITY	OUTSIDE AIR FLOW RATE	ACTUAL ZONE TEMPERATURE	HOT WTR SUP. & RET. TEMP	OUTSIDE AIR TEMPERATURE	SUPPLY AIR TEMP.	DUCT STATIC PRESSURE	RETURN AIR HUMIDITY (RH%)	CHILLED WTR SUP. & RET. TEMP	PRIMARY AIR VALVE POSITION (%)	OUTSIDE AIR DAMPER POSITION	AMBIENT AIR TEMPERATURE	BUILDING WATER USAGE (GPM)	BUILDING ELECTRICAL USAGE (KW)	PRIMARY AIR FLOW RATE (CFM)	MAKEUP WATER FLOW SWITCH	HW LOOP DIFFERENTIAL PRESSURE	FAN SPEED (LOW-MED-HIGH)	CHW LOOP DIFFERENTIAL PRESSURE	CHW VALVE POSITION (%)	HW VALVE POSITION (%)	SPACE PRESSURE DIFFERENTIAL	STEAM PRESSURE	FAN STATUS	FILTER STATUS	SMOKE	FREEZE	PUMP STATUS	OVERRIDE TIMER	ALARM/FAULT			OUTSIDE AIR DAMPER 0-10 Vdc	PUMP SPEED	CHW DECOUPLER VALVE 0-10 Vdc	CHILLED WATER VALVE 0-10 Vdc	HOT WATER VALVE 0-10 Vdc	RETURN AIR DAMPER 0-10 Vdc	PRIMARY AIR VALVE 0-10 Vdc	CHW BYPASS VALVE 0-10 Vdc	STEAM VALVE 0-10 Vdc	SUPPLY FAN SPEED	HW BYPASS VALVE 0-10 Vdc	ZONE TEMPERATURE SETPOINT					START/STOP				
AIR HANDLING UNIT (AHU-1)	X	X	X	X	X	X	X						X	X	X		X	X	X	X	X	X		X	X								X	X			X	X	X	X		X	X			X			X	X	X				X							X				
VAV BOX (TYPICAL)	X	X	X	X	X											X			X				X					X						X								X	X							X		X					X					X				
EXHAUST FAN (EF-1, -3, -4, -5, & -6)	X	X					X																														X						X																				X				
HEATING HOT WATER CONVERTOR (HX-1 & -2)	X	X			X	X	X										X																										X											X								X				
FAN COIL UNITS (TYPICAL)	X	X	X		X		X									X			X												X						X						X														X					X				
CHILLED WATER LOOP SYSTEM (CHWP-1 & -2)	X	X			X	X	X																X																		X		X				X	X					X								X				
HOT WATER LOOP SYSTEM (HWP-1 & -2)	X	X			X	X	X										X												X	X						X					X		X												X						X				
DOMESTIC HOT WATER LOOP SYSTEM (HWCP-1)	X	X					X										X																										X																				X				1
DOMESTIC WATER METER	X	X																									X																																								1
ELECTRIC METER	X	X																										X																																							2
ISOLATION RM SPACE CONTROL MONITOR (SPM)	X	X			X		X																												X								X																				X				
EXHAUST FAN (EF-2)	X	X					X																														X																										X				
DOMESTIC HOT WATER CONVERTOR (WH-1)	X	X			X	X	X										X																										X											X								X				1
RO SUPPLY WATER CONVERTOR (WH-2)	X	X			X	X	X										X																										X											X								X				1

NOTES:
1. REFER TO PLUMBING PLANS FOR ADDITIONAL EQUIPMENT INFORMATION AND LOCATIONS.
2. REFER TO ELECTRICAL PLANS FOR ADDITIONAL EQUIPMENT INFORMATION AND LOCATIONS.

DDC POINTS LIST

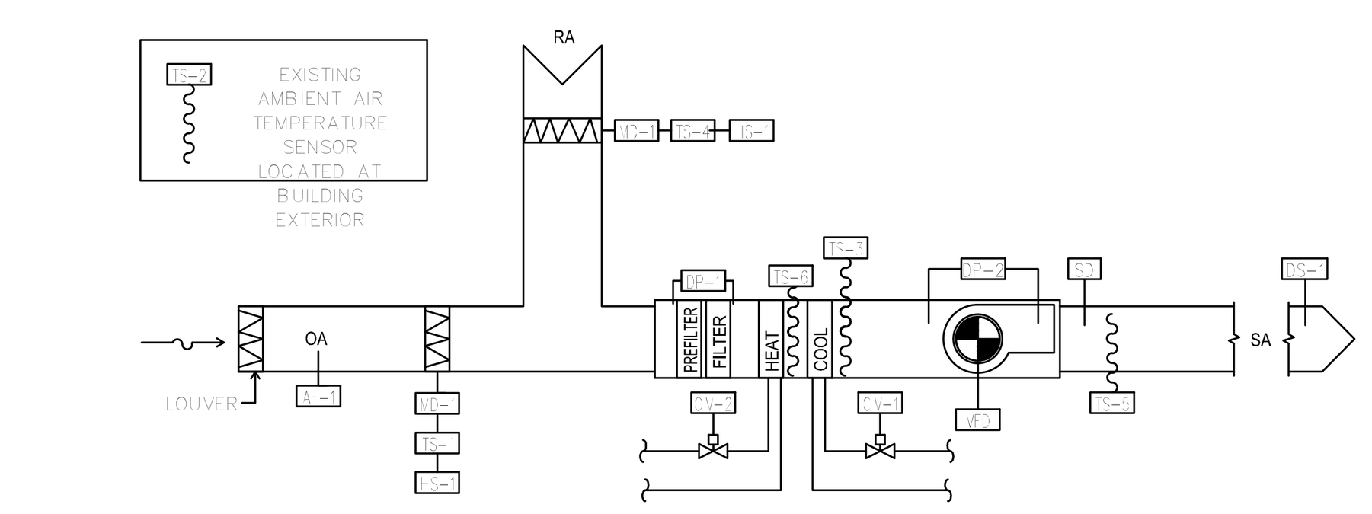
DESIGN CONDITIONS

SEASON	OUTSIDE TEMPERATURE	INSIDE TEMPERATURE	SETBACK TEMPERATURE
SUMMER	92°F DB/772°F WB	75°F DB, 50% RH	80°F DB
WINTER	16°F DB	70°F DB	60°F DB

NOTES:
1. INSIDE SUMMER RELATIVE HUMIDITY IS +/- 10%.
2. INSIDE WINTER DESIGN TEMPERATURE IS +/- 2 DEG F.
3. INSIDE SUMMER DESIGN TEMPERATURE IS +/- 2 DEG F.

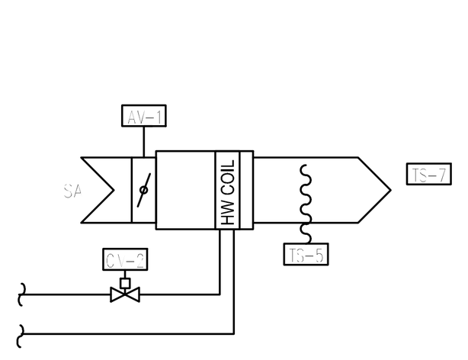
CONTROL DIAGRAM LEGEND:

DP-1	DIFFERENTIAL PRESSURE SENSOR/SWITCH ACROSS FILTER
DP-2	DIFFERENTIAL PRESSURE SENSOR/SWITCH ACROSS FAN
DP-3	HW LOOP DIFFERENTIAL PRESSURE SENSOR
MS-1	MOTOR (ON/OFF)- STARTER AUXILIARY CONTACT
MD-1	MOTORIZED DAMPER
SD	SMOKE DETECTOR
TS-1	OUTSIDE AIR TEMPERATURE SENSOR
TS-2	OUTSIDE AMBIENT AIR TEMPERATURE SENSOR
TS-3	TEMPERATURE SENSOR
TS-4	RETURN AIR TEMPERATURE SENSOR
TS-5	SUPPLY AIR TEMPERATURE SENSOR
TS-6	LOW LIMIT AIR TEMPERATURE SENSOR
TS-7	SPACE TEMPERATURE SENSOR
VFD	VARIABLE FREQUENCY DRIVE
AF	AIR FLOW MONITORING STATION
HS-1	AIR HUMIDITY SENSOR
CV-1	CHILLED WATER CONTROL VALVE (2-WAY)
CV-2	HOT WATER CONTROL VALVE (2-WAY)
OA	OUTSIDE AIR
SA	SUPPLY AIR
EA	EXHAUST AIR
RA	RETURN AIR
DS-1	DUCT STATIC PRESSURE SENSOR
AV-1	AIR VALVE ACTUATOR

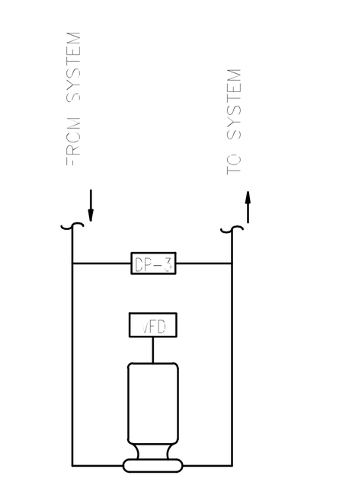


AHU-1
NTS

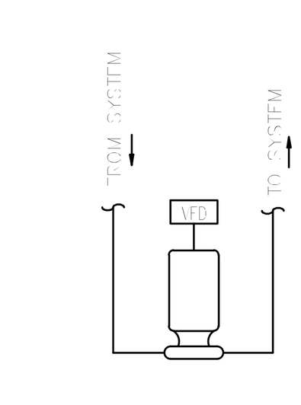
GENERAL NOTES:
1. REFER TO SHEET MH602 FOR CONTROL SEQUENCE OF OPERATIONS.
2. REFER TO SHEET MH603 FOR MECHANICAL SCHEDULES.
3. PROVIDE ALL SENSORS, ACTUATORS, DETECTORS SHOWN IN DIAGRAMS. ALL DEVICES NEW UNLESS NOTED OTHERWISE.
4. WIRE CONTROLS TO DIRECT DIGITAL CONTROL (DDC) PANELS AS INDICATED. CONTROLS ARE TO BE FURNISHED BY THE CONTRACTOR.
5. CONTRACTOR SHALL PROGRAM THE SEQUENCE OF OPERATIONS FOR CONTROLS.
6. REFER TO SPECIFICATIONS FOR COMPLETE REQUIREMENTS.
7. ALL CONTROL AND ELECTRICAL WIRING SHALL BE FIRE AND PLENUM RATED.
8. FIRE ALARM SYSTEMS SHALL BE WIRED BY CONTRACTOR. DUCT SMOKE DETECTORS AND FIRE AND/OR SMOKE DAMPERS SHALL BE TIED INTO THE ALARM SYSTEM BY THE CONTRACTOR PER FIRE DEPARTMENT INSTRUCTIONS AND NFPA REQUIREMENTS.
9. LOCATE TEMPERATURE AND HUMIDITY SENSORS ON WALL 56" AFF.
10. THE BUILDING WEB BASED DDC SYSTEM SHALL BE INTEGRATED WITH THE CAMPUS WIDE ENERGY CONTROL MANAGEMENT SYSTEM.



TYPICAL VAV
NTS



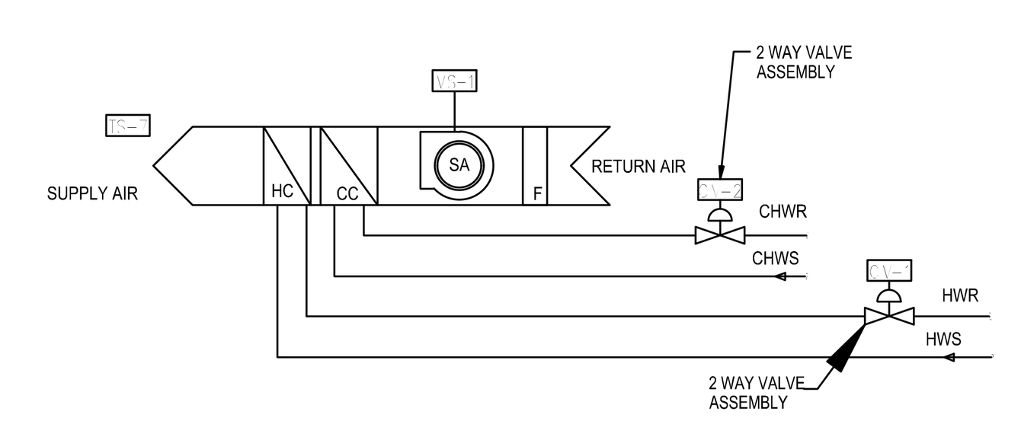
HWP-1 & -2
NTS



CHWP-1 & -2
NTS

CONTROL WIRING SIGNALS

ANALOG INPUTS:	4-20 mA OR 1-5 VDC WITH 12-BIT A/D CONVERSION RESOLUTION MINIMUM.
ANALOG OUTPUTS:	0-10 VDC WITH 8-BIT D/A CONVERSION RESOLUTION MINIMUM.



FAN COIL UNIT
NTS

CONSTRUCTION DOCUMENTS
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Revisions:	Date

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COMMONWEALTH OF VIRGINIA
WILLIAM WALTER BOLTON
Lic. No. 0402035691
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PROFESSIONAL ENGINEER

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	Approved: Chief of Police	Approved: Infection Control Officer	Approved: Chief of Staff
	Approved: Chief of Mental Health Service	Approved: GEMS Coordinator	Approved: Associate Director

Drawing Title: **MECHANICAL CONTROL DIAGRAMS AND POINTS LISTS**	Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**			Date: 2018.02.16
				Project No.: 658-315
Approved: Chief of Facility Management Svc.	Building Number: 2	Checked: RLD	Drawn: CMD	Drawing No.: **MH604**
Approved: Medical Center Director	Location: SALEM VA MEDICAL CENTER			Sheet 101 of 120

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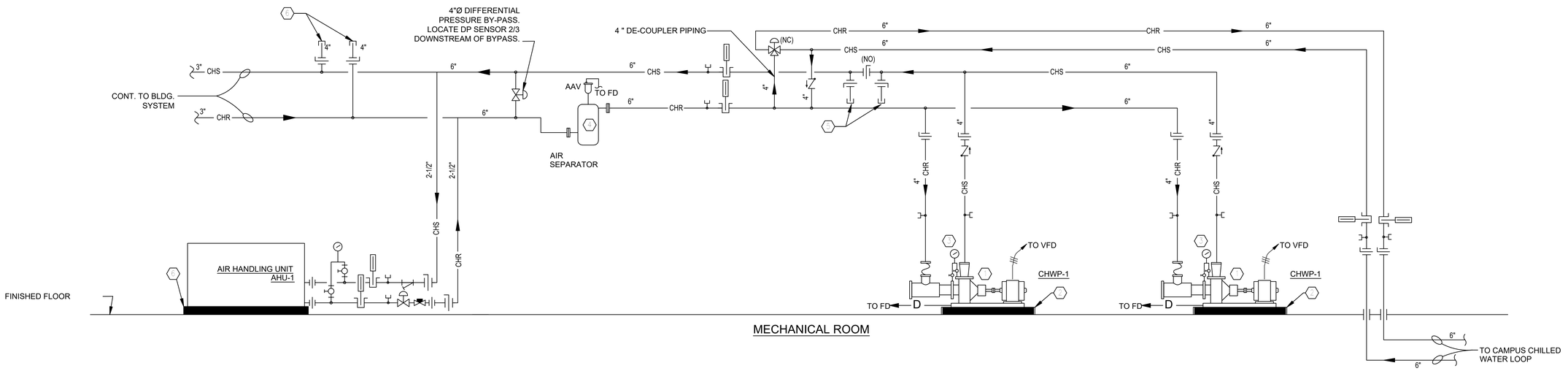

CHILLED WATER LOOP PIPING DIAGRAM

KEYNOTES

- CHILLED WATER PUMPS.
- CONCRETE PAD 4" HIGH AFF.
- PROVIDE PRESSURE GAUGE ACROSS PUMP SUCTION AND DISCHARGE FLANGES. □TYPICAL□
- PROVIDE AIR SEPARATOR.
- 4" BUTTERFLY VALVES WITH BLANK FLANGES FOR CONNECTION OF FUTURE TEMPORARY CHILLER.
- 4" BUTTERFLY VALVES WITH BLANK FLANGES FOR EQUIPMENT CONNECTION OF FUTURE FLOORS ABOVE.
- SEE DRAWINGS CS014 □ CU104 FOR CONTINUATION OF CHILLED WATER LINES.

LEGEND

- LINE SI□E FLEXIBLE CONNECTOR.
- DRAIN VALVES
- PRESSURE GAUGE.
- BUTTERFLY VALVES.
- THERMOMETER.
- 3-WAY CONTROL VALVE.
- 2-WAY CONTROL VALVE.
- UNION
- CONTROLLED FLOW BALANCING VALVE
- GATE VALVE
- STRAINER WITH BLOWDOWN.
- PRESSURE AND TEMPERATURE TEST PORT.
- NON-SLAM CHECK VALVE
- BALL VALVE
- □NO□ NORMALLY OPEN
- □NC□NORMALLY CLOSED

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Revisions:	Date

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Drawing Title: **CHILLED WATER LOOP PIPING DIAGRAM**	Project Title: **RELOCATE AND EXPAND RENAL DIALYSIS**		Date: 2018.02.16
			Project No.: 658-315
Approved: Chief of Facility Management Svc.	Building Number: 2	Checked: RLD / Drawn: CMD	Drawing No.: **MH605**
Approved: Medical Center Director	Location: SALEM VA MEDICAL CENTER		Sheet 102 of 120

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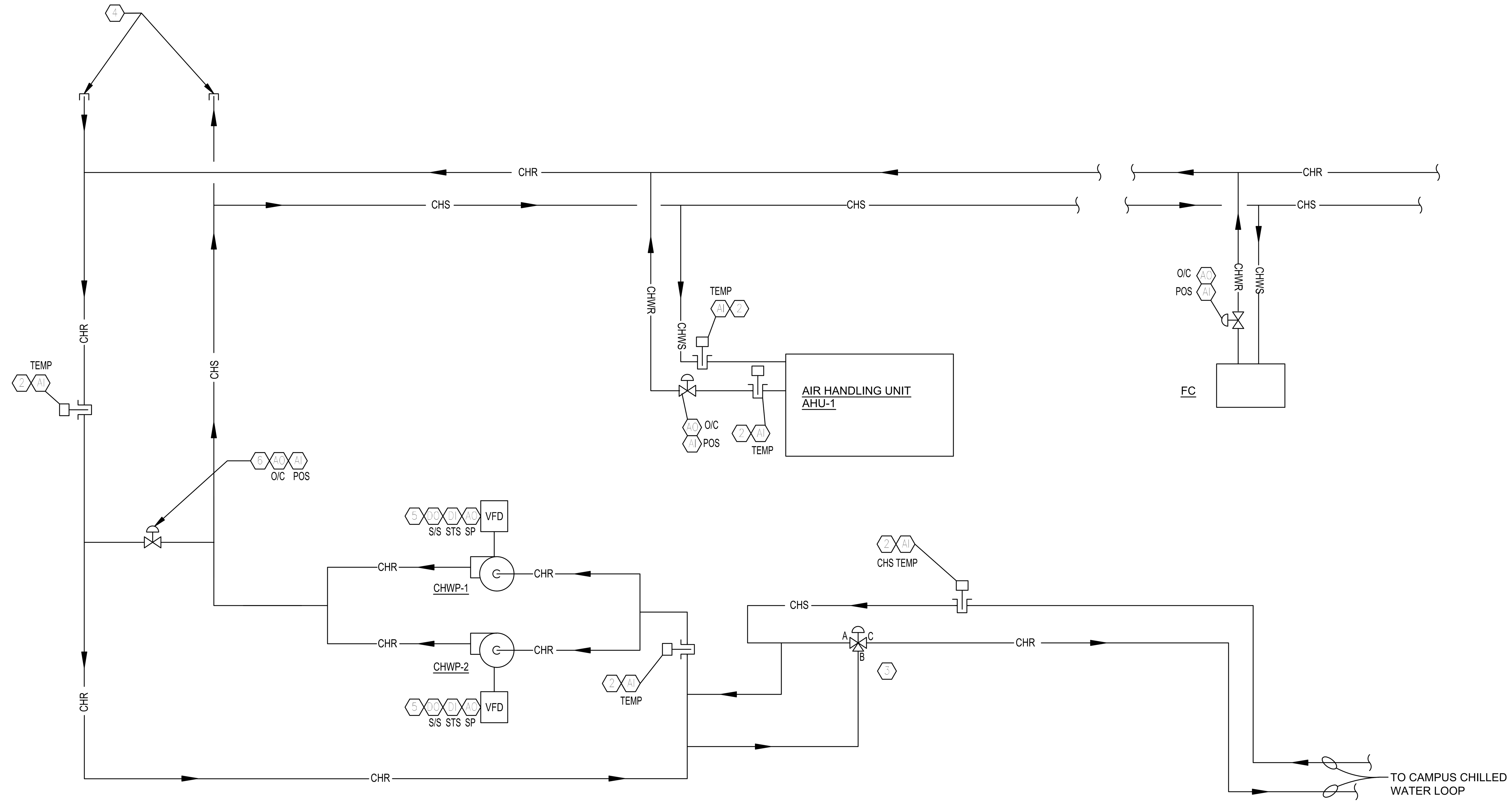

CHILLED WATER LOOP CONTROLS DIAGRAM

CONTROLS SYMBOLS & ABBREVIATIONS

FLT	FAULT
(NC)	NORMALLY CLOSED
(NO)	NORMALLY OPEN
O/C	OPEN/CLOSE
POS	POSITION
PR	PRESSURE
SP	SPEED
STS	STATUS
S/S	START/STOP
TEMP	TEMPERATURE
VFD	VARIABLE FREQUENCY DRIVE

- ANALOG OUTPUT
- ANALOG INPUT
- DIGITAL OUTPUT
- DIGITAL INPUT
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- TEMPERATURE SENSOR
- PUMP
- DP DIFFERENTIAL PRESSURE SENSOR

KEYNOTES

- EXISTING OUTSIDE AIR TEMPERATURE/HUMIDITY SENSOR.
- TEMPERATURE TRANSMITTER WITH STAINLESS STEEL RESISTANCE TEMPERATURE DETECTOR IMMERSION SENSOR.
- BUILDING CHILLED WATER LOOP DE-COUPLER VALVE.
- 4" BUTTERFLY VALVES WITH BLANK FLANGES FOR EQUIPMENT CONNECTION OF FUTURE FLOORS ABOVE.
- PROVIDE CHILLED WATER PUMPS WITH VFDS.
- PROVIDE 2-WAY CONTROL VALVE FOR CHW BY-PASS TO MAINTAIN MINIMUM CHW FLOW (TAB CONTRACTOR TO VERIFY MINIMUM SECONDARY LOOP FLOW).

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Drawing Title	CHILLED WATER LOOP CONTROLS DIAGRAM
Approved: Chief of Facility Management Svc.	
Approved: Medical Center Director	
Project Title	RELOCATE AND EXPAND RENAL DIALYSIS
Building Number	2
Checked	RLD
Drawn	CMD
Location	SALEM VA MEDICAL CENTER
Date	2018.02.16
Project No.	658-315
Drawing No.	MH606
Sheet	103 of 120

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