GENERAL NOTES

DEMOLITION

EXISTING HVAC PIPING, DUCTWORK, AND EQUIPMENT SHOWN IS BASED ON EXISTING PLANS AND FIELD OBSERVATION WITHOUT DEMOLITION. AFTER DEMOLITION, ANY CLARIFICATION REQUIRED TO DETERMINE SCOPE OF WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.

THE CONTRACTOR SHALL VISIT THE JOB SITE AND THOROUGHLY FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS.

DRAWINGS DO NOT SHOW EVERY EXISTING PIPE, CONDUIT, DUCT, ETC. CONTRACTOR SHALL TAKE CARE TO REMOVE ONLY ITEMS REQUIRED TO BE REMOVED AND VERIFY PIPES, DUCTS, ETC. BEFORE REMOVAL.

REMOVAL OF ITEMS SHALL INCLUDE ASSOCIATED HANGERS, ANCHOR BOLTS AND OTHER APPURTENANCES. WHERE SUCH REMOVAL RESULTS IN OPEN HOLES, VOIDS OR EXPOSURE OF DAMAGED SURFACES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING AND FINISHING THE SURFACE TO MATCH ADJACENT CONDITIONS. THIS WORK SHALL BE COORDINATED WITH ARCHITECTURAL FINISH SCHEDULES WHERE APPLICABLE.

BUILDING IS TO REMAIN OCCUPIED DURING CONSTRUCTION. REMOVAL OR SHUT-DOWN OF EQUIPMENT THAT AFFECTS ANY OCCUPIED AREA'S AIR CONDITIONING OR HEATING SHALL ONLY BE DONE AS APPROVED OR TEMPORARY AIR CONDITIONING OR HEATING SHALL BE PROVIDED AT CONTRACTOR'S EXPENSE. THIS MAY REQUIRE NIGHT AND WEEKEND WORK TO KEEP BUILDING IN OPERATION.

REMOVE EXISTING DUCTWORK AND PIPING NOT TO BE REUSED.

ALL MATERIALS REMOVED UNDER DEMOLITION, NOT TO BE RELOCATED OR DESIGNATED TO BE TURNED OVER TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR, UNLESS OTHERWISE NOTED, AND SHALL BE REMOVED COMPLETELY FROM THE SITE.

GENERAL ITEMS

GENERAL NOTES ON THIS DRAWING ARE APPLICABLE TO EACH HVAC DRAWING OF THIS SET. SEE EACH DRAWING FOR SPECIFIC NOTES APPLICABLE TO THAT DRAWING.

OVERHEAD DUCTWORK AND PIPING IN SPACES WITH CEILINGS SHALL BE CONCEALED IN INTERSTITIAL SPACE UNLESS OTHERWISE NOTED.

PROVIDE PIPE SLEEVES LARGE ENOUGH TO ALLOW FOR REQUIRED LATERAL MOVEMENT OF PIPING.

EXERCISE DUE CAUTION IN INSTALLING RUNOUTS AND BRANCH PIPING FROM MAINS FOR EXPANSION MOVEMENT.

COORDINATE LOCATION OF GRILLES, REGISTERS, DIFFUSERS, THERMOSTATS AND OTHER WALL OR CEILING MOUNTED HVAC ACCESSORIES WITH REFLECTED CEILING PLAN, LIGHTING FIXTURE LAYOUT AND ACCESSORIES INSTALLED BY OTHER TRADES SO AS TO PRESENT A NEAT AND ATTRACTIVE INSTALLATION THROUGHOUT THE ENTIRE BUILDING. IT IS THE INTENT FOR GRILLES, REGISTERS AND DIFFUSERS TO BE INSTALLED IN THE CENTER OF CEILING PANELS.

ARRANGE PIPING AND DUCTWORK AS REQUIRED TO CLEAR STRUCTURE, DUCTS, CONDUITS, ETC. ALLOWING SPACE FOR PIPE HANGERS, EXPANSION LOOPS AND ACCESS TO VALVES, FILTERS, AND MAINTENANCE OF EQUIPMENT.

COORDINATE LOCATION AND INSTALLATION OF EQUIPMENT WITH OTHER TRADES.

DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF DOORS, WINDOWS, ETC.

THERMOSTATS AND/OR TEMPERATURE SENSORS SHALL BE LOCATED IN THE ROOMS INDICATED. INSTALL AT APPROX. 46" ABOVE FINISH FLOOR TO MATCH THE HEIGHT OF WALL SWITCHES OR OTHER WALL MOUNTED DEVICES.

VALVES AND SPECIALTIES SHALL BE LINE SIZE EXCEPT FOR CONTROL VALVES OR UNLESS NOTED OTHERWISE.

PIPING AND DUCTWORK INSULATION SHALL BE RUN CONTINUOUSLY THROUGH NON-RATED FLOORS, WALLS, ROOF AND PARTITIONS, UNLESS OTHERWISE INDICATED.

NO PIPING SHALL BE SMALLER THAN 3/4" UNLESS OTHERWISE NOTED.

FOR PIPE SIZES NOT INDICATED ON PLANS, SEE EQUIPMENT CONNECTION DETAILS, FLOW DIAGRAMS AND RISER DIAGRAMS AND PIPE SIZING SCHEDULE.

PROVIDE UNION OR FLANGED CONNECTIONS AT EACH PIECE OF EQUIPMENT AND ON BOTH SIDES ON CONTROL VALVES AND PRESSURE REGULATING VALVES. PROVIDE SHUT-OFF VALVES ON BOTH SIDES OF AUTOMATIC VALVES.

PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE SPECIFICATIONS. ADDITIONAL SUPPORTS OR HANGERS SHALL BE ADJACENT TO ELBOWS, TO PREVENT WEIGHT OF PIPING BEING PLACED ON THE EQUIPMENT.

CORRECT SETTING ON BALANCING FITTINGS SHALL BE PERMANENTLY MARKED.

INSTALL ANCHORS AND EXPANSION LOOPS WHERE INDICATED AND WHERE REQUIRED TO ALLOW FOR EXPANSION.

LOCATE AND SIZE CONCRETE PADS AND CURBS FOR MECHANICAL EQUIPMENT IN ACCORDANCE WITH ACTUAL EQUIPMENT PURCHASED.

HOT WATER PIPING

PROVIDE MINIMUM PITCH SUFFICIENT TO INSURE ADEQUATE VENTING AND DRAINAGE.

PROVIDE MANUAL AIR VENTS AT HIGH POINTS OF SYSTEM.

PROVIDE 1/2" DRAIN VALVES AND CAPPED CONNECTIONS AT LOW POINTS IN PIPING SYSTEMS FOR DRAINING.

SHEET METAL

PROVIDE INTERNAL SOUND ABSORPTIVE DUCT LINING FOR EXTENT NOTED. DUCT DIMENSIONS ARE CLEAR INSIDE DUCT LINING DIMENSIONS.

PROVIDE A MINIMUM OF THREE TIMES THE FAN DIAMETER OF STRAIGHT DUCTWORK OFF THE SUPPLY AIR FAN DISCHARGE BEFORE ANY TAKEOFFS OR ELBOWS.

DUCTWORK UPSTREAM OF VAV TERMINAL UNITS SHALL BE CONSTRUCTED TO THE SMACNA STATIC PRESSURE CLASSIFICATION OF 4 IN. WG AND SEAL CLASS "A". OTHER DUCTWORK SHALL BE CONSTRUCTED TO THE SMACNA STATIC PRESSURE CLASSIFICATION OF 2 IN. WG AND SEAL CLASS "B".

PROVIDE EXTENDED VOLUME DAMPER CONTROL RODS SO THAT HANDLES ARE WELL CLEAR OF DUCT INSULATION.

MAINTENANCE

EQUIPMENT WITH FILTERS SHALL BE INSTALLED SO THAT FILTERS CAN BE EASILY REMOVED AND REPLACED.

PROVIDE ACCESS TO ANY INSPECTION OR MAINTAINABLE DEVICE, EQUIPMENT, ETC. – ACCESS OR ACCESS DOOR SHALL BE OF ADEQUATE SIZE TO WORK ON DEVICE.

EXAMINE MANUFACTURER'S LITERATURE TO DETERMINE RECOMMENDED CLEARANCES. THESE CLEARANCES SHALL BE ESTABLISHED AND MAINTAINED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THESE REQUIREMENTS WITH ALL OTHER TRADES.

LEGEND

- DEMOLITION NOTE DESIGNATION
- NEW WORK NOTE DESIGNATION
- POINT OF CONNECTION NEW TO EXISTING
- POINT OF DEMOLITION LIMIT
- DETAIL NUMBER
- DRAWING NUMBER WHERE DRAWN
- SECTION LETTER
- DRAWING NUMBER WHERE SHOWN
- BUILDING NO. WHERE EQUIPMENT IS LOCATED
- ITEM (TERMINAL UNIT SHOWN)
- ITEM NUMBER (TERMINAL UNIT NO. 1)
- SERVED BY AIR HANDLER UNIT NO. 1
- WALL THERMOSTAT
- SMOKE DETECTOR
- GRILLE, REGISTER OR DIFFUSER MARK (CFM AS INDICATED)
- TERMINAL UNIT
- MANUAL VOLUME DAMPER
- STAINLESS STEEL DUCT
- REFRIGERANT LIQUID
- REFRIGERANT SUCTION
- VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)
- STANDARD RADIUS ELBOW (LONG RADIUS)
- NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH)
- EXISTING DUCT TO REMAIN
- EXISTING DUCT TO BE REMOVED
- SUPPLY DUCT (UP & DOWN)
- EXHAUST DUCT (UP & DOWN)
- RETURN DUCT (UP & DOWN)
- ROUND AND SQUARE 4-WAY CEILING DIFFUSERS
- SQUARE 3-WAY CEILING DIFFUSERS
- SQUARE 2-WAY CEILING DIFFUSERS
- LINEAR SLOT DIFFUSER
- EXHAUST OR RETURN CEILING REGISTER OR GRILLE
- CONNECT NEW DUCT TO EXISTING DUCT
- LIMIT OF DEMOLITION

ABBREVIATIONS

ACCU	AIR-COOLED CONDENSING UNIT
AHU	AIR-HANDLING UNIT
CFM	CUBIC FEET PER MINUTE
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
F	FAHRENHEIT
FT	FEET
IN WC	INCH WATER COLUMN
IN WG	INCH WATER GAUGE
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LF	LINEAR FOOT (FEET)
LWT	LEAVING WATER TEMPERATURE
MBH	1000 BTUH
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MIN	MINIMUM
NC	NOISE CRITERIA
OA	OUTSIDE AIR
PD	PRESSURE DROP
PG	PRESSURE GAGE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR
RL	REFRIGERANT LIQUID LINE
RS	REFRIGERANT SUCTION
SA	SUPPLY AIR
SI	SQUARE INCHES
SP	STATIC PRESSURE
SQ FT	SQUARE FOOT (FEET)
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TU	TERMINAL UNIT
WG	WATER GAGE

PHASING NOTE:

THIS JOB SHALL BE DONE IN PHASES. DURING EACH PHASE, MAINTAIN THE OTHER PORTION OF THE BUILDING IN FULL OPERATING MODE. REVIEW PHASING PLANS ON ARCHITECTURAL SHEETS FOR LOCATIONS AND ADDITIONAL INFORMATION AND COORDINATE WITH THE VA REPRESENTATIVE. ANY PHASING CONCERNS SHALL BE BROUGHT TO VA'S ATTENTION PRIOR TO COMMENCING WORK.

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

Revisions:	Date

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Drawing Title: MECHANICAL GENERAL NOTES

Approved: Project Director

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

Project Number: 652-12-113

Building Number: 500

Drawing Number: 500-MH-01

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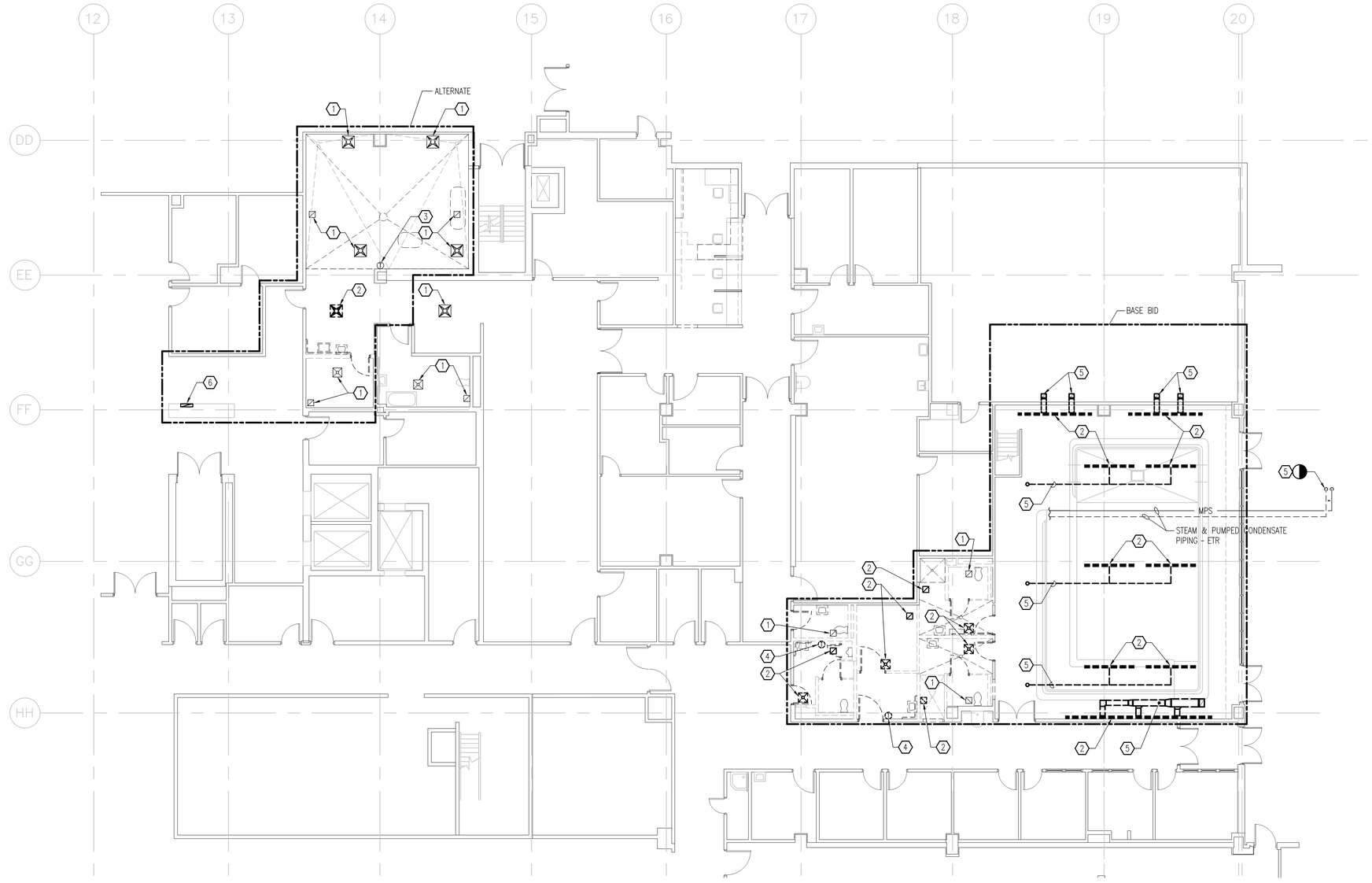
Department of Veterans Affairs

VA FORM 08-6231



MECHANICAL FIRST FLOOR DEMOLITION PLAN

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

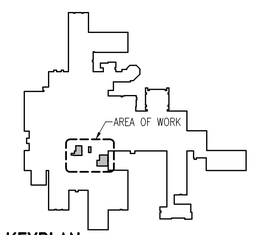
DEMOLITION NOTES

1. DISCONNECT, STORE, AND PREPARE CEILING MODULE FOR REINSTALLATION.
2. REMOVE DIFFUSER/GRILLE.
3. DISCONNECT, STORE, AND PREPARE TEMPERATURE SENSOR FOR REINSTALLAION.
4. REMOVE TEMPERATURE SENSOR, CLEAN AND STORE FOR REUSE. REMOVE CONTROL WIRING.
5. REMOVE DUCTWORK, INSULATION, HANGERS, AND SUPPORTS COMPLETE.
6. REMOVE SIDEWALL GRILL COMPLETE. REMOVE ASSOCIATED RETURN AIR DUCTWORK DOWN TO RETURN AIR MAIN BELOW. CAP OPENING IN DUCTWORK.

ADDITIONAL DEMOLITION NOTES

REMOVE DUPLEX STEAM CONDENSATE PUMP COMPLETE. RETAIN ELECTRICAL CIRCUIT AND DISCONNECT FOR REUSE. REMOVE PORTION OF PUMPED CONDENSATE PIPING AND INSULATION. TO POINT INDICATED.

REMOVE 42"x8'ø SHELL AND TUBE HEAT EXCHANGER AND SUPPORTS COMPLETE. REMOVE LPC PIPING AND INSULATION TO CONDENSATE PUMP COMPLETE. REMOVE PORTION OF STEAM PIPING AND INSULATION. REMOVE ASSOCIATED STEAM CONTROL VALVE.



KEYPLAN

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Revisions: | Date

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Drawing Title: MECHANICAL FIRST FLOOR DEMOLITION PLAN

Approved Project Director

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

Project Number: 652-12-113

Building Number: 500

Drawing Number: 500-MH-02

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

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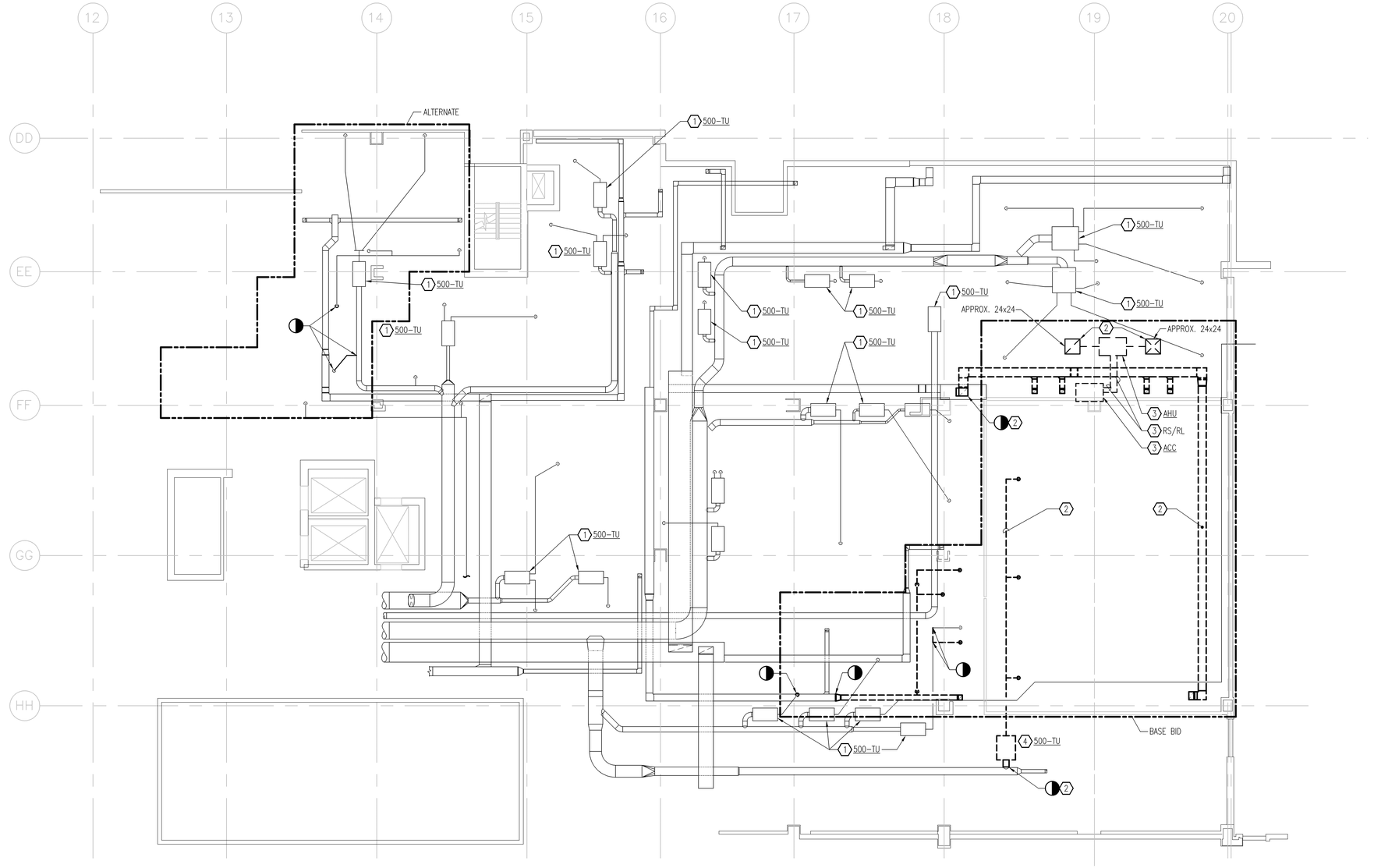


MECHANICAL FIRST FLOOR INTERSTITIAL DEMOLITION PLAN

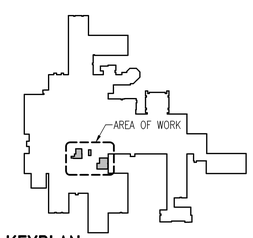
SCALE: 1/8" = 1'-0"

DEMOLITION NOTES

1. ETR VAV BOX.
2. REMOVE DUCTWORK, INSULATION, HANGERS, AND SUPPORTS TO POINT INDICATED. CAP AND SEAL DUCTWORK. PROVIDE TEMPORARY WEATHERPROOF CAP OVER ROOF OPENINGS.
3. REMOVE ROOFTOP DEHUMIDIFICATION UNIT AND ALL ASSOCIATED APPURTENANCES COMPLETE.
4. REMOVE VAV BOX COMPLETE.

REFRIGERANT RECOVERY NOTE

REFRIGERANT FROM EXISTING MECHANICAL SYSTEMS SHALL BE RECOVERED AND RECYCLED FOR RECLAIM. EQUIPMENT CAPABLE OF PULLING A VACUUM OF LESS THAN 1000 MICRONS OF MERCURY SHALL BE USED TO RECOVER REFRIGERANT. MECHANICAL SYSTEMS SHALL NOT BE OPENED TO ATMOSPHERE UNTIL ALL REFRIGERANT IS FULLY RECOVERED. THE CONTRACTOR SHALL PROVIDE CONTAINERS FOR THE STORAGE OF THE REFRIGERANT. REFRIGERANT SHALL BECOME THE PROPERTY OF THE CONTRACTOR.



KEYPLAN

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

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Drawing Title: MECHANICAL FIRST FLOOR INTERSTITIAL DEMOLITION PLAN

Approved Project Director:

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

Project Number: 652-12-113

Building Number: 500

Drawing Number: 500-MH-03

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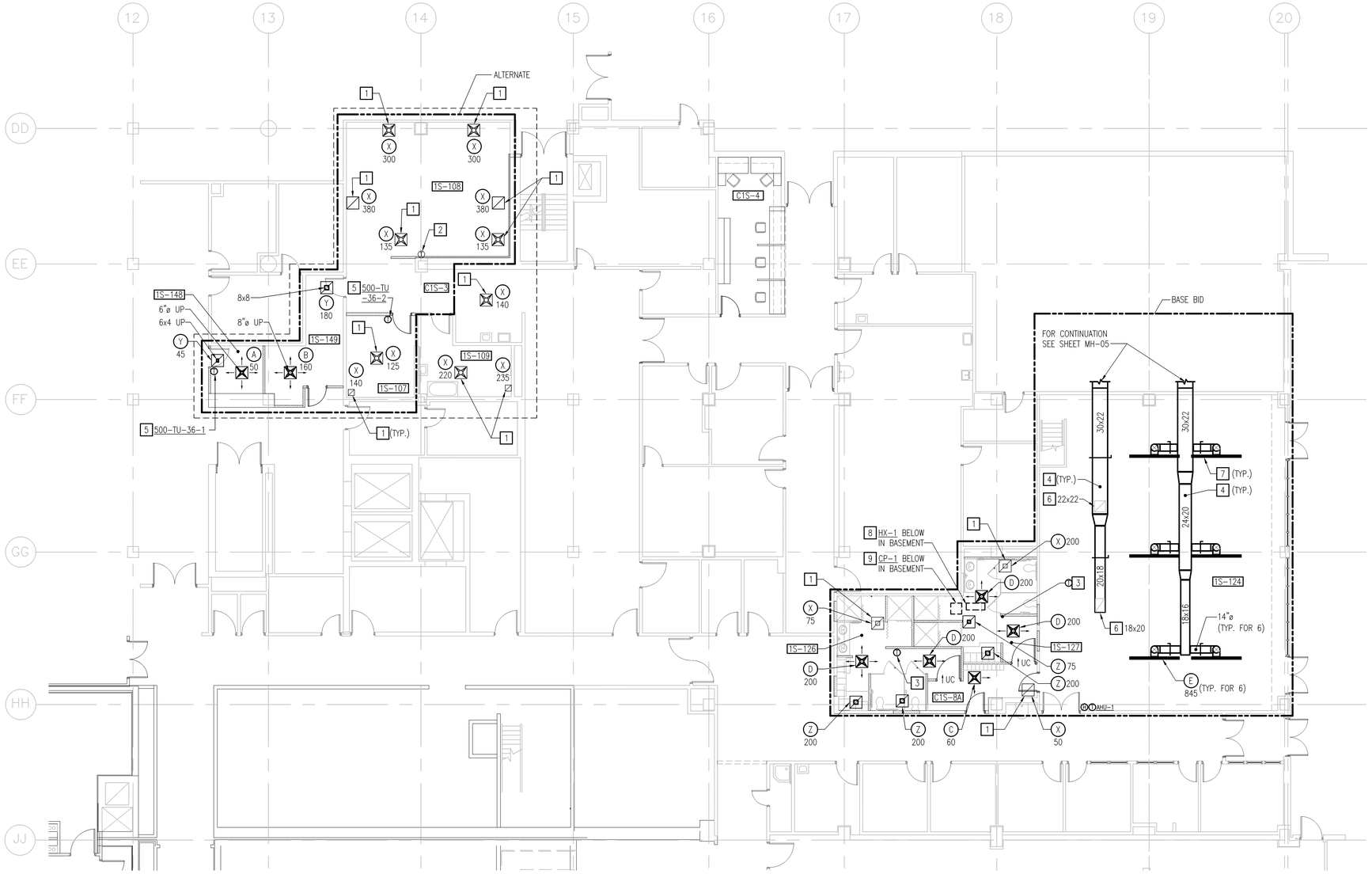


MECHANICAL FIRST FLOOR NEW WORK PLAN

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

NOTES THIS SHEET

1. REINSTALL CEILING MODULE. EXTEND DUCTWORK TO ACCOMMODATE CEILING MODIFICATIONS.
2. REINSTALL TEMPERATURE SENSOR. PROVIDE PNEUMATIC TUBING AS NECESSARY.
3. REINSTALL TEMPERATURE SENSOR. MOUNT PER GENERAL NOTES. PROVIDE PNEUMATIC TUBING AS REQUIRED.
4. PROVIDE INSULATED ALUMINUM, PVC, OR FIBERGLASS DUCTWORK, HANGERS, AND SUPPORTS COMPLETE.
5. PROVIDE TEMPERATURE SENSOR AND PNEUMATIC TUBING COMPLETE.
6. PROVIDE OPENING ON TOP SIDE OF DUCTWORK. PROVIDE 1/4"x1/4" ALUMINUM WIRE MESH OVER DUCT OPENING.
7. COORDINATE DIFFUSER LOCATION WITH CEILING SYSTEM. SEE ARCHITECTURAL DRAWINGS.
8. REMOVE AND PROVIDE NEW STEAM TO HOT WATER HEAT EXCHANGER, TRAP, AND SUPPORTS COMPLETE. EXISTING PIPING TO REMAIN. CONTRACTOR TO REMOVE PIPING AS NECESSARY FOR NEW EQUIPMENT INSTALLATION. CONTRACTOR TO RECONNECT TO EXISTING TERMINATIONS AND PROVIDE PIPING/OFFSETS NEEDED FOR NEW EQUIPMENT.
9. REMOVE AND PROVIDE DUPLEX CONDENSATE PUMP COMPLETE. EXISTING PIPING TO REMAIN. CONTRACTOR TO REMOVE PIPING AS NECESSARY FOR NEW EQUIPMENT INSTALLATION. CONTRACTOR TO RECONNECT TO EXISTING TERMINATIONS AND PROVIDE PIPING/OFFSETS NEEDED FOR NEW EQUIPMENT.

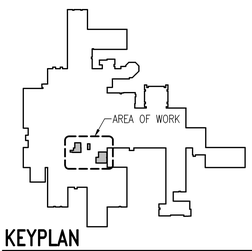
ADDITIONAL NEW WORK NOTES

PROVIDE AND INSTALL DUPLEX STEAM CONDENSATE PUMP. RECONNECT ELECTRICAL CIRCUIT AND DISCONNECT. EXTEND PUMPED CONDENSATE PIPING TO CONNECT TO EXISTING. INSULATE TO MATCH EXISTING. (B&G: 1 HP, 460V, 3ø, MODEL 6ACC)

PROVIDE AND INSTALL 42"x8"ø SHELL AND TUBE HEAT EXCHANGER AND SUPPORTS. PROVIDE LPC PIPING AND INSULATION TO CONDENSATE PUMP. PROVIDE AND INSTALL STEAM PIPING, CONTROL VALVE, AND INSULATION AND CONNECT TO EXISTING.

ROOM SCHEDULE

1S-104	ELECTRIC SERVICE BAY
1S-107	STORAGE 2
1S-108	PHYSICAL THERAPY
1S-109	TRAINING BATHROOM
1S-124	THERAPEUTIC POOL
1S-126	MEN'S LOCKER ROOM
1S-127	WOMEN'S LOCKER ROOM
1S-148	OFFICE
1S-149	STORAGE 1
C1S-3	CORRIDOR
C1S-4	CHECK-IN
C1S-8A	CORRIDOR



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Drawing Title: MECHANICAL FIRST FLOOR NEW WORK PLAN

Approved Project Director

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

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Building Number: 500

Drawing Number: 500-MH-04

Dwg. 24 of 41

Office of Construction and Facilities Management

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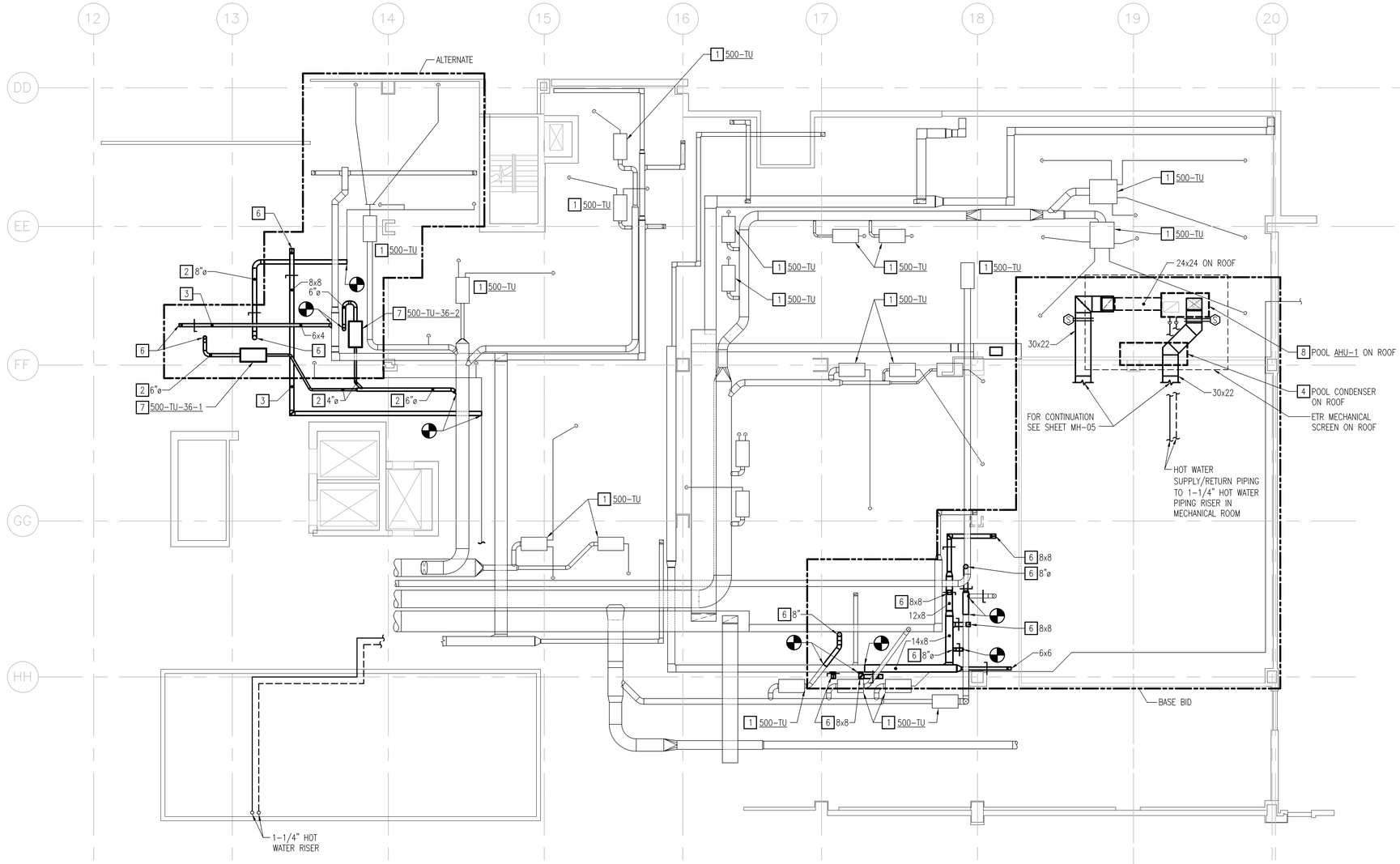
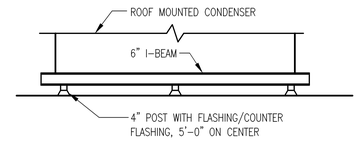


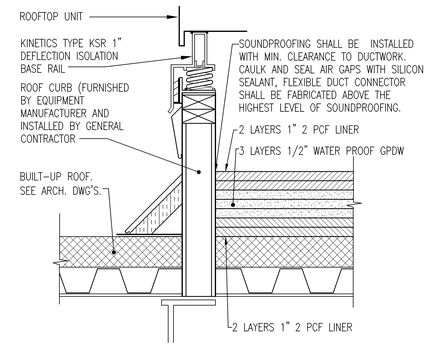
MECHANICAL FIRST FLOOR INTERSTITIAL NEW WORK PLAN

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



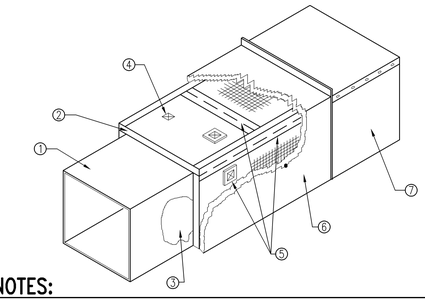
ROOF MOUNTED CONDENSER DETAIL

NO SCALE



ROOFTOP UNIT ACOUSTICAL CURB DETAIL

NO SCALE



NOTES:

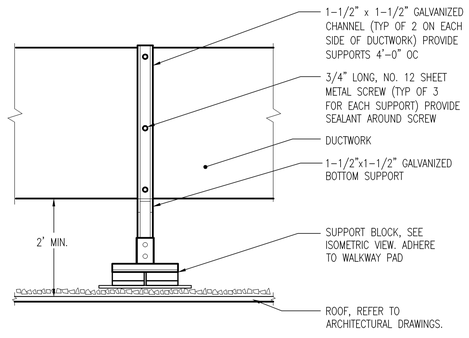
1. SHEET METAL DUCT
2. RIGID FIBERGLASS
3. INSULATION, 3" THICK, 3.0 PCF WITH VAPOR BARRIER JACKET. INSULATION ADHESIVE, 100% COVERAGE
4. MECHANICAL FASTENERS, 12" O.C., BEGINNING A MAXIMUM OF 3" FROM SEAM, EDGE OR JOINT.
5. VAPOR RETARDING TAPE OVER JOINTS, BREAKS, SEAMS, FASTENERS AND PENETRATIONS OF VAPOR BARRIER JACKET.
6. WEATHER-BARRIER MASTIC REINFORCED WITH FABRIC OR MESH. APPLY ONE COAT OVER INSULATION. THEN WRAP WITH FAB-CLOTH THEN APPLY TWO ADDITIONAL COATS OF BITUMASTIC SEALER.
7. ALUMINUM OR GALVANIZED JACKETING APPLIED FOR MECHANICAL ABUSE PROTECTION AND WEATHER PROTECTION. CAULK AND SEAL ALL JOINTS AND SEAMS W/ELASTOMERIC SEALANT. PAINT ENTIRE JACKET WITH WHITE MULE HIDE ELASTOMERIC SELANT, TYPE A-300.

EXTERIOR DUCTWORK DETAIL

NO SCALE

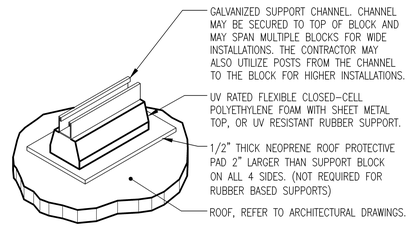
NOTES THIS SHEET

1. ETR VAV BOX.
2. PROVIDE INSULATED SUPPLY DUCTWORK, HANGERS, AND SUPPORTS COMPLETE.
3. PROVIDE UNINSULATED EXHAUST/RETURN DUCTWORK, HANGERS, AND SUPPORTS COMPLETE.
4. PROVIDE CONDENSING UNIT ON ROOF. PROVIDE AND MOUNT UNIT ON 6" I-BEAMS.
5. PROVIDE RS/RL/HOT GAS BYPASS PIPING, INSULATION, HANGERS, AND SUPPORTS COMPLETE.
6. CORE DRILL AND SAW CUT CONCRETE FLOOR FOR DUCT PENETRATION.
7. PROVIDE SHUT-OFF TYPE VAV TERMINAL UNIT, HANGERS, AND SUPPORTS COMPLETE. SUSPEND FROM OVERHEAD STRUCTURE.
8. PROVIDE AHU, ROOF CURB, FLASHING, COUNTER FLASHING, RS/RL PIPING, HWS/HWR PIPING, ROOF PENETRATION, AND INSULATION COMPLETE.

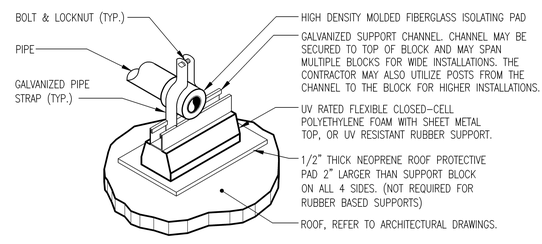


ROOFTOP DUCT SUPPORT DETAIL

NO SCALE

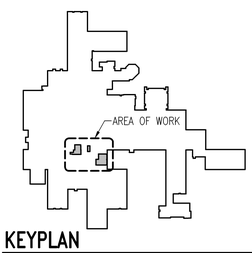


NOTE:
THE PORTION OF SUPPORT WHICH IS IN CONTACT WITH DUCTWORK SHALL BE COVERED WITH DUCT INSULATION AND SEALED WEATHER TIGHT WITH DUCTWORK



PIPE ROOF SUPPORT DETAIL

NO SCALE



KEYPLAN

NTS

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

Revisions:	Date

CONSULTANTS:

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Drawing Title: MECHANICAL FIRST FLOOR INTERSTITIAL NEW WORK PLAN AND DETAILS

Approved: Project Director

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

Project Number: 652-12-113

Building Number: 500

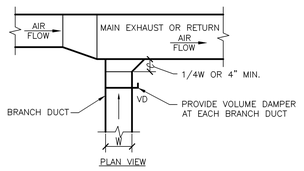
Drawing Number: 500-MH-05

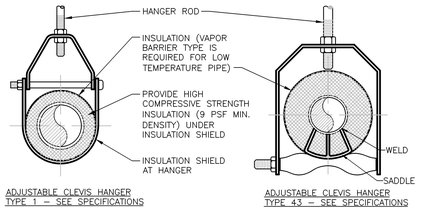
Dwg. 25 of 41

Office of Construction and Facilities Management

Department of Veterans Affairs

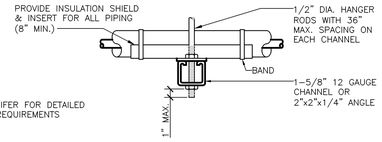
VA FORM 08-6231





D2 EXHAUST OR RETURN BRANCH DUCTWORK

NTS



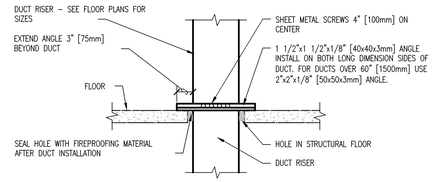
NOTES:
SEE SPECIFER FOR DETAILED HANGER REQUIREMENTS

SIDE VIEW TRAPEZE HANGER FOR UP TO 1000 LB. [453KG] UNIFORM LOAD

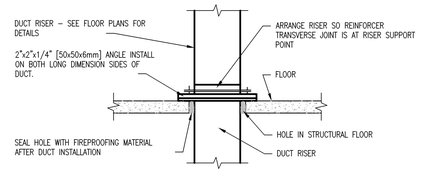
MAXIMUM PIPE/TUBING SUPPORT SPACING																			
NOM. SIZE	IN.	THRU 3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	FT.	7	7	7	9	10	11	12	14	16	17	19	22	23	25	27	28	30	32
TUBING	FT.	5 FT	6	7	8	8	9	10	12	13	14	16	–	–	–	–	–	–	–
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

F5 PIPE HANGERS

NTS



0.5 INCH WG [125Pa] TO 2 INCHES WG [500Pa] DUCT RISER SUPPORT



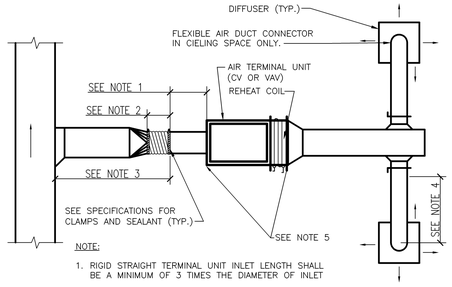
2 INCHES WG [500Pa] TO 4 INCHES WG [1000Pa] DUCT RISER SUPPORT

NOTE:
ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND FAN ROOM FLOORS SHALL BE PROVIDED WITH A 3" [75mm] HIGH CONCRETE CURB AROUND OPENING FOR DUCT.

D7 DUCT RISER SUPPORTS

NTS

DESIGNER'S NOTE:
INDICATE ON DRAWING THE DUCT PRESSURE CLASS 2" WG [500Pa] WG, 3" WG [750Pa] OR 4" WG [1000Pa].

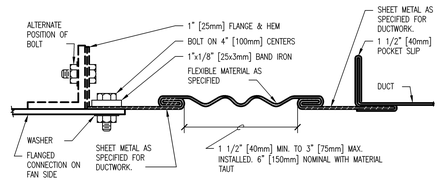


NOTE:

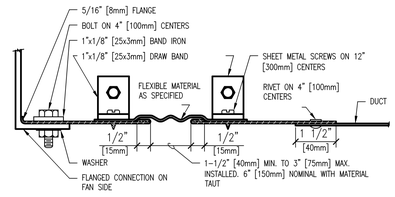
1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET
2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'–0".
3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET. 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'.
4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'–0". 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.
6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

F8 DUCT CONNECTIONS - AIR TERMINAL UNITS

NTS



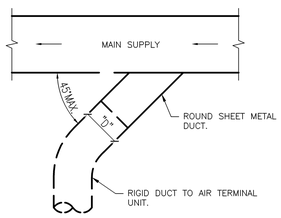
RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

C5 FLEXIBLE DUCT CONNECTIONS

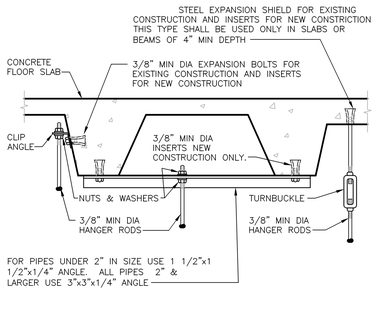
NTS



PLAN VIEW

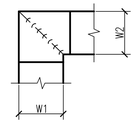
C2 SUPPLY DUCT TAKEOFF - AIR TERMINAL UNIT

NTS



D3 SECURING HANGER RODS IN CONCRETE

NTS

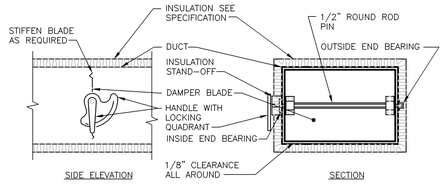


NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" RADIUS, 1 1/2" MAXIMUM SPACE BETWEEN VANES AND A 3/4" TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" VANES SHALL BE DOUBLE VANE TYPE.

F2 DUCTWORK SQUARE VANE ELBOWS

NTS

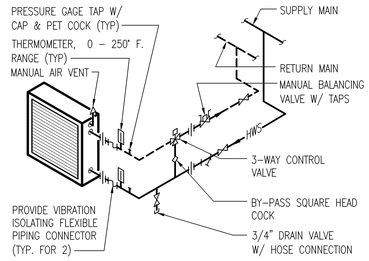


NOTE:

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.

B2 VOLUME DAMPER DETAIL

NTS

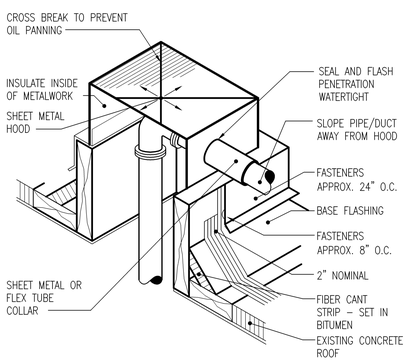


NOTES:

1. ARRANGE PIPING TO PERMIT REMOVAL OF COIL.
2. THE MANUAL BALANCING VALVES SHALL BE INSTALLED BY THE CONTRACTOR IN CONFORMANCE WITH VALVE MANUFACTURER'S RECOMMENDED SPACING UP AND DOWNSTREAM FROM PIPE CHANGES IN DIRECTION AND/OR OTHER VALVES AND COMPONENTS IN THE PIPING.

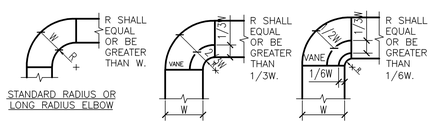
HOT WATER COIL PIPING DETAIL

NO SCALE



PIPE ROOF PENETRATION DETAIL

NO SCALE

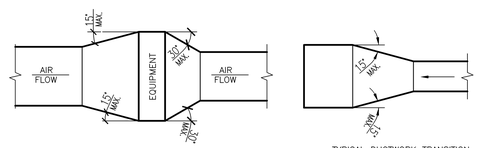


NOTE:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

F4 DUCTWORK RADIUS ELBOWS

NTS



TYPICAL DUCTWORK TRANSITION WITH EQUIPMENT MOUNTED IN DUCT PLAN OR SIDE VIEW

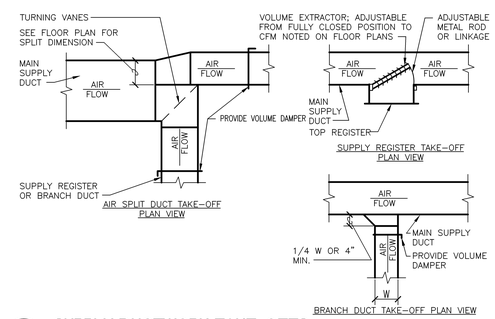
TYPICAL DUCTWORK TRANSITION PLAN OR SIDE VIEW

NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)

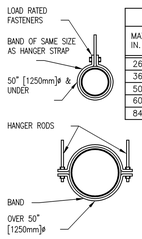
F6

NTS



F8 SUPPLY DUCTWORK TAKE-OFFS

NTS



HANGER STRAPS OR RODS			
MAX. DUCT ø IN. [mm]	QUANTITY/SIZE IN. [mm]	MAX. LOAD LBS. [kg]	MAX SPACING IN. [mm]
26 [650]	ONE 1 [25] x 22 GA STRAP	260 [119]	144 [3600]
36 [900]	ONE 1 [25] x 18 GA STRAP	420 [190]	144 [3600]
50 [1250]	ONE 1 [25] x 16 GA STRAP	700 [317]	144 [3600]
60 [1500]	TWO 3/8 [10]ø. RODS	1320 [598]	144 [3600]
84 [2100]	TWO 1/2 [13]ø RODS	2500 [1133]	144 [3600]

NOTE:
TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

F7 ROUND DUCT HANGERS

NTS

Revisions:	Date

CONSULTANTS:

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Drawing Title: MECHANICAL DETAILS

Approved Project Director:

Project Title: PM&R AREA RENOVATION

Location: 1201 BROAD ROCK BLVD., RICHMOND, VA 23249

Date: 11/5/2013 | Checked: RAL | Drawn: MCD

Project Number: 652-12-113

Building Number: 500

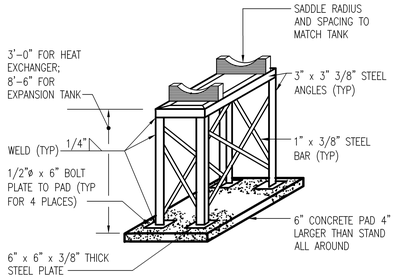
Drawing Number: 500-MH-06

Dwg. 26 of 41

Office of Construction and Facilities Management

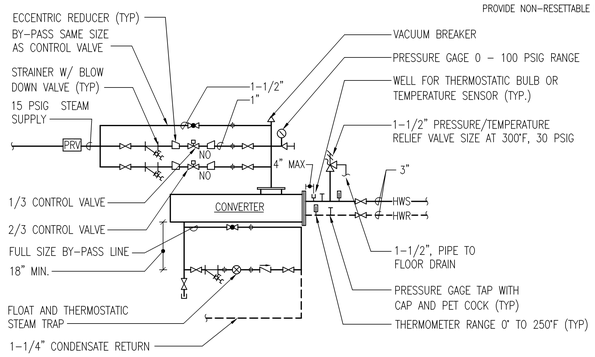
Department of Veterans Affairs

VA FORM 08-6231



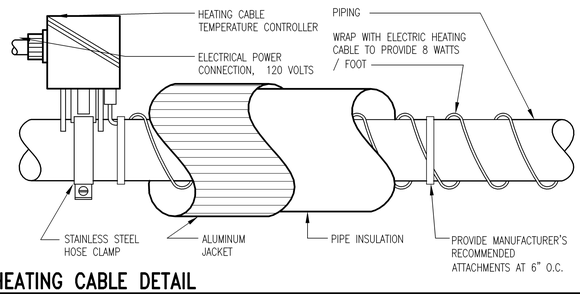
HEAT EXCHANGER / EXPANSION TANK SUPPORT DETAIL

NTS



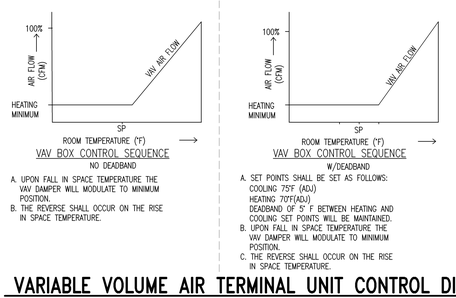
CONVERTER PIPING DIAGRAM

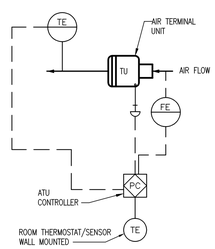
NO SCALE



HEATING CABLE DETAIL

NO SCALE





NO SUPPLEMENTAL HEATING

VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

NTS

STEAM TO WATER HEAT EXCHANGER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	WATER CONDITIONS				STEAM PRESSURE		CONTROL VALVE	TRAP		REMARKS
					FLOW	EWT	LWT	WPD	ENT CONTROL VALVE	ENT HEAT EXCHANGER		TRAP #	CAPACITY	
					GPM	°F	°F	FT	PSIG	PSIG	LBS/HR		LBS/HR	
HX-1	BG-146 POOL EQUIPMENT ROOM	POOL	POOL WATER	SHELL & TUBE	75	40	53	9	30	15	493.7	TP-1	987.4	WATER SIDE OF HEAT EXCHANGER TO BE CUPRO-NICKEL OR MATERIAL SUITABLE FOR POOL WATER

STEAM CONDENSATE PUMP SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE UNIT	FLOW EACH PUMP	DISCHARGE PRESSURE	MIN RECEIVER SIZE	NOMINAL POWER EACH	MOTOR			REMARKS
								PHASE	VOLT	RPM	
				GPM	PSIG	GAL	HP				
CP-1	POOL EQUIPMENT ROOM	POOL	DUPLEX	18	30	30	1	3	460	1750	----

NOTE

PROVIDE NON-RESETTABLE HOUR METERS TO LOG RUN TIME OF EACH PUMP.

AIR DEVICE SCHEDULE (SUPPLY)

MARK	TYPE	AIR FLOW		MAX APD	MOUNTING	PANEL/FRAME SIZE	NECK SIZE	NC	DAMPER	FINISH	REMARKS
		MIN	MAX								
		CFM	CFM	IN WG		IN x IN	IN				
A	PERFORATED	50	120	0.100	LAY-IN	24 x 24	6 ø	25	OBD	WHITE	SEE NOTES
B	PERFORATED	125	210	0.100	LAY-IN	24 x 24	8 ø	25	OBD	WHITE	SEE NOTES
C	PERFORATED	50	120	0.100	SURFACE MOUNT	24 x 24	6 ø	25	OBD	WHITE	SEE NOTES
D	PERFORATED	125	210	0.100	SURFACE MOUNT	24 x 24	8 ø	25	OBD	WHITE	SEE NOTES
E	LINEAR SLOT	845	845	0.100	CEILING	–	14 ø	25	OBD	BLACK	PROVIDE PLENUM

NOTES
1. SEE FLOOR PLAN FOR THROW PATTERN.
2. SEE DETAIL FOR DAMPER IN BRANCH DUCT SERVING EACH DIFFUSER.
3. PROVIDE SQUARE TO ROUND ADAPTER.

SINGLE DUCT AIR TERMINAL UNIT SCHEDULE

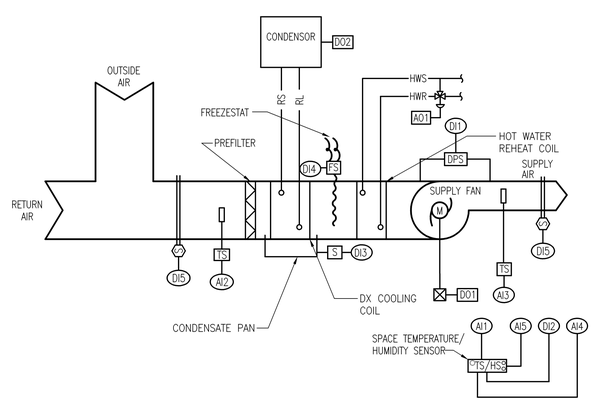
MARK	LOCATION	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	SIZE	AIR FLOW		ADDITIONAL SOUND ATTUNATION REQUIRED	CONTROL TYPE	CONTROL SEQUENCE	PERIMETER SUPPLEMENTAL HEAT LINK	REMARKS
					MAX	MIN					
					CFM	CFM					
500-TU-36-1	1ST FLOOR INTERSTITIAL	1S-148	1-AHU36	4"	50	50	NONE	VAV	5 DEGREE DEADBAND	NONE	----
500-TU-36-2	1ST FLOOR INTERSTITIAL	1S-107	1-AHU36	4"	125	75	NONE	VAV	5 DEGREE DEADBAND	NONE	----

AIR DEVICE SCHEDULE (RETURN/EXHAUST)

MARK	TYPE	AIR FLOW		MAX APD	MOUNTING	PANEL/FRAME SIZE	NECK SIZE	NC	DAMPER	FINISH	REMARKS
		MIN	MAX								
		CFM	CFM	IN WG		IN x IN	IN x IN				
X	EXISTING CEILING DIFFUSER/GRILLE	–	–	–	–	–	–	–	–	–	-----
Y	RETURN/EXHAUST REGISTER	50	200	0.1	LAY-IN	24 x 24	8 x 8	18	OBD	WHITE	35 DEGREE DEFLECTION, 3/4" BLADE SPACING
Z	RETURN/EXHAUST REGISTER	50	200	0.1	SURFACE MOUNT	12 x 12	8 x 8	18	OBD	WHITE	35 DEGREE DEFLECTION, 3/4" BLADE SPACING

SPLIT SYSTEM AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	TOTAL SUPPLY AIR FLOW	MIN. OUTSIDE AIR FLOW	EXT STATIC PRESSURE	COOLING CAPACITY						HEATING CAPACITY					ELECTRICAL DATA						CONDENSER					REMARKS
							MIN TOTAL CAPACITY	MIN SENS CAPACITY	MIN SEER	EAT		OSA DESIGN TEMP	MIN. HEAT CAPACITY	HEATING FLOW	EAT DB	LAT Db	OSA DESIGN TEMP	AIR HANDLER		MCA	PHASE	VOLT	MARK	CONDENSER	MCA	PHASE	VOLT	
										Db	Wb																		
				CFM	CFM	IN	MBH	MBH		°F	°F	°F	MBH	GPM	°F	°F	°F	HP	CONTROL					CONTROL					
AHU-1	ROOF	POOL	SPLIT SYSTEM	5065	1065	1	121.4	90.7	11	76.8	65.6	82	143.3	14.3	58.8	85	17	3	CONSTANT VOLUME	36	3	460	ACC-1	CONSTANT VOLUME	5.6	3	460	SUITABLE FOR NATATORIUM



POOL AHU-1 (CV)		
LOCAL DDC CONTROLLER		
INPUTS		
ANALOG	AI1	SPACE TEMPERATURE
	AI2	MIXED AIR TEMPERATURE
	AI3	SUPPLY AIR TEMPERATURE
	AI4	SPACE HUMIDITY
	AI5	SPACE TEMPERATURE SETPOINT
DIGITAL	DI1	SUPPLY AIR FAN STATUS
	DI2	OVERRIDE
	DI3	CONDENSATE HIGH LEVEL
	DI4	FREEZESTAT
	DI5	DUCT SMOKE DETECTOR (TYP FOR 2)
OUTPUTS		
ANALOG	AO1	PRIMARY HW VALVE CONTROL
DIGITAL	DO1	SUPPLY AIR FAN START
	DO2	CONDENSING UNIT COMPRESSOR

NATATORIUM (CONSTANT VOLUME) CONTROL DIAGRAM (DDC)

NO SCALE

SEQUENCE OF OPERATION (POOL) - AHU-1

PROVIDE WITH THE MANUFACTURER'S STAND ALONE DDC CONTROLLER WITH BACNET MS/TP INTERFACE. THE SEQUENCE OF OPERATION SHALL BE SPECIFIC FOR NATATORIUM DEHUMIDIFICATION UNITS, SEE SPECIFICATIONS.

SAFETY CONTROL: SMOKE DETECTOR SHALL BE PROVIDED. THROUGH DDC CONTROL, IT SHALL DE-ENERGIZE THE ASSOCIATED AHU AND SIGNAL FIRE ALARM PANEL UPON THE DETECTION OF THE PRODUCTS OF COMBUSTION. CONDENSATE HIGH LEVEL ALARM SHALL DE-ENERGIZE SUPPLY FAN.

FREEZE PROTECTION: IF MIXED AIR TEMPERATURE FALLS BELOW 40°F DURING HEATING MODE, THE FREEZE STAT SHALL DE-ENERGIZE THE AHU SUPPLY AIR FAN AND FULLY OPEN THE HOT WATER VALVES TO COIL.

MORNING WARM-UP: THE UNIT SHALL EMPLOY OPTIMUM START. PRIOR TO OCCUPIED STATUS, THE UNIT SHALL GO INTO MORNING WARM-UP. THE SUPPLY FAN SHALL BE ENERGIZED AND THE HW VALVE SHALL BE FULLY OPEN TO THE COIL UNTIL OCCUPIED SPACE TEMPERATURE SETPOINT IS ACHIEVED. THE UNIT SHALL THEN CYCLE TO MAINTAIN SPACE OCCUPIED TEMPERATURE SETPOINT.

DEHUMIDIFICATION MODE: UPON A CALL FOR DEHUMIDIFICATION, HUMIDITY ABOVE 52% RH, SUPPLY FAN SHALL ENERGIZE, CONDENSER AND DX COIL SHALL, AND ENERGIZE REHEAT TO MODULATE TO MAINTAIN SPACE TEMPERATURE SETPOINT. DEHUMIDIFICATION SHALL CONTINUE UNTIL SPACE RH FALLS BELOW 48%.

MORNING COOL-DOWN: THE UNIT SHALL EMPLOY OPTIMUM START. PRIOR TO OCCUPIED STATUS, THE UNIT SHALL GO INTO MORNING COOL-DOWN. THE SUPPLY FAN SHALL BE ENERGIZED, THE CW VALVE SHALL MODULATE TO MAINTAIN A 55°F LEAVING AIR TEMPERATURE AND THE HOT WATER VALVE SHALL BE FULLY CLOSED TO THE COIL. ONCE OCCUPIED SPACE TEMPERATURE IS ACHIEVED, THE SUPPLY FAN SHALL CYCLE TO MAINTAIN OCCUPIED SETPOINT UNTIL OCCUPIED MODE IS INITIATED.

ALARMS: ALARM IF LEAVING AIR TEMPERATURE EXCEEDS 60°F IN COOLING MODE OR DROPS BELOW 50°F IN HEATING MODE. ALARM IF SUPPLY FAN OR EXHAUST FAILS TO START OR FAILS DURING OPERATION. ALARM ON CONDENSATE HIGH LEVEL.

CONDENSATE SENSOR: HIGH LEVEL SENSOR SHALL BE PROVIDED. UPON DETECTION OF HIGH LEVEL OF CONDENSATE, UNIT SHALL DE-ENERGIZE.

Revisions:	Date

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