MECHANICAL ABBREVIATIONS

(NOTE: NOT ALL ABBREVIATIONS MAY APPEAR ON DRAWINGS)

ABV	ABOVE	IS	INSECT SCREEN
A/E	ARCHITECT / ENGINEER	IU	INDUCTION UNIT
AAV	AUTOMATIC AIR VENT	IV	INLET VANES
AD	ACCESS DOOR		
AF	AFTER FILTER	J	(INTENTIONALLY LEFT BLANK)
AFF	ABOVE FINISHED FLOOR		
AHU	AIR-HANDLING UNIT	kPa	KILOPASCAL
AMP	AMPERAGE	kW	KILOWATT
AP	ACCESS PANEL		
APD	AIR PRESSURE DROP	L/s	LITERS PER SECOND
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	LAT	LEAVING AIR TEMPERATURE
		LBS/HR	POUNDS PER HOUR
AW	AIR WASHER	LF	LINEAR FOOT (FEET)
		LH	LATENT HEAT
BD	BUTTERFLY DAMPER	LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)
BDD	BACKDRAFT DAMPER	LPRC	LOW PRESSURE STEAM RETURN (CLEAN)
BF	BELOW FLOOR	LPS	LOW PRESSURE STEAM
BFP	BACKFLOW PREVENTER	LPSC	LOW PRESSURE STEAM (CLEAN)
BFT	BOILER PLANT FIRE TUBE	LTCP	LOCAL TEMPERATURE CONTROL PANEL
BG	BELOW GRADE	LVG	LEAVING
BTU	BRITISH THERMAL UNIT	LVR	LOUVER
BTUH	BRITISH THERMAL UNIT PER HOUR	LWT	LEAVING WATER TEMPERATURE
		MA	MIXED AIR
CC	COOLING COIL	MAU	MAKE-UP AIR UNIT
CCD	COOLING COIL CONDENSATE DRAIN	MAX	MAXIMUM
CD	CEILING DIFFUSER	MB	MIXING BOX
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION1)	MBH	1000 BTUH
		MCA	MINIMUM BRANCH CIRCUIT AMPACITY
CD-2	CONSTRUCTION DOCUMENTS (SUBMISSION2)	MIN	MINIMUM
		MM	MILLIMETER
CFH	CUBIC FEET PER HOUR	MOD	MOTOR OPERATED DAMPER
CFM	CUBIC FEET PER MINUTE	MOV	MOTOR OPERATED VALVE
CFT	CUBIC FEET	MTD	MEAN TEMPERATURE DIFFERENCE
CG	CEILING GRILLE	MVD	MANUAL VOLUME DAMPER
CH	CHILLER	MZ	MULTI-ZONE
CHP	CHILLED WATER PUMP		
CHW	CHILLER WATER		
CHR	CHILLED WATER RETURN	(N)	NEW
CHS	CHILLED WATER SUPPLY	NA	NOT APPLICABLE
CI	CAST IRON	NC	NORMALLY CLOSED
CO	CLEAN OUT	NO	NORMALLY OPEN
CP	CONDENSATE PUMP	NOM	NOMINAL
CR	CEILING REGISTER	NTS	NOT TO SCALE
CRAC	COMPUTER ROOM AIR CONDITIONING UNIT	OA	OUTSIDE AIR
		OAG	OUTSIDE AIR GRILLE
CU	CONDENSING UNIT	OAI	OUTSIDE AIR INTAKE
CW	COLD WATER (POTABLE)	OD	OUTSIDE DIAMETER
CWP	CONDENSER WATER PUMP		
CWR	CONDENSER WATER RETURN (TO COOLING TOWER)	P	PUMP
		PA	PASCAL
CWS	CONDENSER WATER SUPPLY (FROM COOLING TOWER)	PC	PUMPED CONDENSATE
		PCF	POUNDS PER CUBIC FOOT (FEET)
(D)	DEMOLISH	PD	PRESSURE DROP
D-1	OUTDOOR AIR DAMPER	PG	PRESSURE GAGE
D-2	RETURN AIR DAMPER	PHC	PREHEAT COIL
D-3	RELIEF AIR DAMPER	PPM	PARTS PER MILLION
DB	DECIBELS	PSI	POUNDS PER SQUARE INCH
Db	DRY-BULB TEMPERATURE	PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
DD-1	DESIGN DEVELOPMENT (SUBMISSION1)	PSIG	POUNDS PER SQUARE INCH - GAGE
DD-2	DESIGN DEVELOPMENT (SUBMISSION2)	PSV	PRESSURE SAFETY VALVE
DDC	DIRECT DIGITAL CONTROLS		
DEG	DEGREE	(R)	RELOCATE/RELOCATED
DF	DIFFUSER	(RB)	REBALANCE
DIA	DIAMETER	R/E	RETURN OR EXHAUST
DMPR	DAMPER - AUTOMATIC	RA	RETURN AIR
DOM	DOMESTIC	RAT	RETURN AIR TEMPERATURE
DP	DEW POINT TEMPERATURE	RCP	RADIANT CEILING PANEL
DPA	DIFFERENTIAL PRESSURE ASSEMBLY	REA	RELIEF AIR
DPS	DIFFERENTIAL PRESSURE SENSOR	RF	RETURN FAN
DSS	DUCTLESS SPLIT-SYSTEM (EVAPORATOR)	RG	RETURN GRILLE
DX	DIRECT EXPANSION	RH	RELATIVE HUMIDITY
		RHC	REHEAT COIL
EA	EXHAUST AIR	RLA	RUN LOAD AMPERE
EAT	ENTERING AIR TEMPERATURE	RO	REVERSE OSMOSIS
EER	ENERGY EFFICIENCY RATIO	RPM	REVOLUTIONS PER MINUTE
EF	EXHAUST FAN	RR	RETURN REGISTER
EG	EXHAUST GRILLE	RTU	ROOF TOP UNIT
EH	EXHAUST HOOD	RV	RELIEF VALVE
EJ	EXPANSION JOINT		
ENT	ENTERING	SA	SUPPLY AIR
ER	EXHAUST REGISTER	SAD	SOUND ATTENUATOR DEVICE
ESP	EXTERNAL STATIC PRESSURE	SAT	SUPPLY AIR TEMPERATURE
EWT	ENTERING WATER TEMPERATURE	SCFM	STANDARD CUBIC FEET PER MINUTE
(E)	EXISTING TO REMAIN	SD	SMOKE DETECTOR
		SD	SUPPLY AIR DIFFUSER
F	FAHRENHEIT	SD-1	SCHEMATIC DESIGN (SUBMISSION1)
F&T	FLOAT AND THERMOSTATIC	SD-2	SCHEMATIC DESIGN (SUBMISSION2)
F/SDPR	COMBINATION FIRE SMOKE DAMPER	SDPR	SMOKE DAMPER
FA	FREE AREA	SDR	SMOKE DAMPER (RETURN)
FC	FLEXIBLE CONNECTION	SDS	SMOKE DAMPER (SUPPLY)
FCU	FAN COIL UNIT (4 PIPE)	SEN	SENSIBLE HEAT
FCUC	FAN COIL UNIT COOLING ONLY	SF	SUPPLY FAN
FCUH	FAN COIL UNIT HEATING ONLY	SG	SUPPLY AIR GRILLE
FCW	FORWARD CURVED WHEEL (FAN)	SP	STATIC PRESSURE
FD	FLOOR DRAIN	SP GR	SPECIFIC GRAVITY
FD	FIRE DAMPER	SPS	STATIC PRESSURE SENSOR
FM	FLOW METER	SQ FT	SQUARE FOOT (FEET)
FPM	FEET PER MINUTE	SR	SUPPLY AIR REGISTER
FPS	FEET PER SECOND	SS	STAINLESS STEEL
FR	FLOOR REGISTER	ST	STEAM TRAP
FS	FLOW SWITCH	SVS	STEAM VENT SILENCER
FSTAT	FREEZESTAT		
FT	FEET	T&PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
FT-LB	FOOT-POUND		
FTR	FIN TUBE RADIATION	TAB	TESTING, ADJUSTING, BALANCE
FV	FACE VELOCITY	TD	TEMPERATURE DIFFERENCE
		TDH	TOTAL DYNAMIC HEAD
GA	GAUGE	TG	TRANSFER GRILLE
GAL	GALLONS	TP	TRAP
GH	GRAVITY HOOD	TR	TOP REGISTER
GPD	GALLONS PER DAY	TSP	TOTAL STATIC PRESSURE
GPH	GALLONS PER HOUR	TSTAT	THERMOSTAT
GPM	GALLONS PER MINUTE	TU	TERMINAL UNIT
GRR	GLYCOL-WATER RUN AROUND RETURN	UC	UNDER CUT
GRS	GLYCOL-WATER RUN AROUND SUPPLY	UL	UNDERWRITERS LABORATORY
GS	GALVANIZED STEEL		
		V	VALVE
H	HUMIDIFIER	VAV	VARIABLE AIR VOLUME
H&CW	HOT & COLD WATER	VB	VACUUM BREAKER
HC	HEATING COIL	VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
HD	HEAD	VFD	VARIABLE FREQUENCY DRIVE
HD	HOOD	VI	VIBRATION ISOLATOR
HOA	HAND/OFF/AUTOMATIC	VIV	VARIABLE INLET VANES
HP	HORSEPOWER	VPS	VARIABLE PRIMARY SYSTEM
HRC	HEAT RECOVERY COIL	VR	VACUUM (STEAM CONDENSATE) RETURN
HRD	HEAT RECOVERY DEVICE		
HRW	HEAT RECOVERY WHEEL	W	WATTS
HSTAT	HUMIDSTAT	Wb	WET-BULB (TEMPERATURE)
HVU	HEATING AND VENTILATING UNIT	WC	WATER COOLED
HW	HOT WATER	WCACU	WATER-COOLED COMP RM A/C
HWC	HOT WATER COIL	WEF	WALL EXHAUST FAN
HWHC	HOT WATER HEATING COIL	WF	WATER FILTER
HWP	HEATING HOT WATER PUMP	WFCV	WATER FLOW CONTROL VALVE
HWR	HEATING HOT WATER RETURN	WFM	WATER FLOW METER
HWS	HEATING HOT WATER SUPPLY	WFMD	WATER FLOW MEASURING DEVICE
HWUH	HOT WATER UNIT HEATER	WG	WATER GAGE
HX	HEAT EXCHANGER	WHA	WATER HAMMER ARRESTOR
HZ	HERTZ		
I/O	INPUT/OUTPUT		
IAQ	INDOOR AIR QUALITY		
ID	INSIDE DIAMETER		
IFB	INTEGRAL FACE AND BYPASS		
IN	INCHES		
IN HG	INCHES OF MERCURY		
IN WC	INCH WATER COLUMN		
IRH	INFRARED HEATER		

GENERAL PIPING SYMBOLS

- DIRECTION OF PIPE PITCH (DOWN)
- DIRECTION OF FLOW
- ANCHOR
- REDUCER OR INCREASER
- ECCENTRIC REDUCER
- TOP CONNECTION, 45° OR 90°
- BOTTOM CONNECTION, 45° OR 90°
- SIDE CONNECTION
- CAPPED OUTLET
- RISE OR DROP IN PIPE
- UNION
- PIPE UP
- PIPE DOWN
- INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES
- FLOAT & THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES
- THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES
- THERMOMETER
- PRESSURE GAGE
- FLOW ELEMENT
- REFRIGERANT SIGHT GLASS
- TEST PLUG (PRESSURE/TEMPERATURE)
- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- HEAT TRACE

PIPING SYMBOLS

- HPS — HIGH PRESSURE STEAM (60 PSIG AND ABOVE)
- HPR — HIGH PRESSURE STEAM CONDENSATE RETURN
- MPS — MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)
- MPR — MEDIUM PRESSURE STEAM CONDENSATE RETURN
- LPS — LOW PRESSURE STEAM (15 PSIG AND BELOW)
- LPC — LOW PRESSURE STEAM CONDENSATE RETURN
- PC — CONDENSATE PUMP DISCHARGE
- HWS — HOT WATER HEATING SUPPLY
- HWR — HOT WATER HEATING RETURN
- CHS — GLYCOL-WATER HEATING SUPPLY
- CHR — GLYCOL-WATER HEATING RETURN
- CHWS — CHILLED WATER SUPPLY
- CHWR — CHILLED WATER RETURN
- GCS — CHILLED GLYCOL-WATER SUPPLY
- GCR — CHILLED GLYCOL-WATER RETURN
- MW — MAKE-UP WATER
- D — DRAIN LINE
- V — VENT LINE
- GRS — GLYCOL-WATER RUN AROUND SUPPLY
- GRR — GLYCOL-WATER RUN AROUND RETURN
- TC — TUBE CLEANER WATER SUPPLY
- CF — CHEMICAL FEED
- OFL — OVERFLOW
- A — COMPRESSED AIR
- CW — COLD WATER (CITY WATER)
- SW — SOFTENED WATER
- HW — HOT WATER
- RO — REVERSE OSMOSIS

VALVE SYMBOLS

- GATE VALVE - THREADED/FLANGED
- GLOBE VALVE - THREADED/FLANGED
- GATE VALVE WITH 3/4" HOSE ADAPTER
- CHECK VALVE
- WYE STRAINER (WITH BALL VALVE & HOSE CONNECTION)
- WYE STRAINER WITH VALVED DRAIN AND QUICK-COUPLE HOSE CONNECTOR
- FLEXIBLE CONNECTION
- ANGLE GLOBE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- MODULATING CONTROL VALVE
- MODULATING CONTROL BUTTERFLY VALVE
- TWO POSITION CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- THREE-WAY TWO POSITION CONTROL VALVE
- PRESSURE REGULATING VALVE
- PRESSURE SAFETY VALVE
- AUTOMATIC BALANCING CONTROL VALVE
- WATER FLOW BALANCING VALVE
- CIRCUIT SETTER VALVE
- GATE VALVE WITH GLOBE-VALVED BYPASS
- PLUG VALVE
- CONTROL VALVE (CV) - FLOAT-OPERATED
- PRESSURE REDUCING VALVE (PRV)

DUCTWORK SYMBOLS

- UP / DN — SUPPLY DUCT (UP & DOWN)
- UP / DN — EXHAUST DUCT (UP & DOWN)
- UP / DN — RETURN DUCT (UP & DOWN)
- ROUND AND SQUARE 4-WAY CEILING DIFFUSERS
- SQUARE 3-WAY CEILING DIFFUSERS
- SQUARE 2-WAY CEILING DIFFUSERS
- SQUARE 1-WAY CEILING DIFFUSERS
- SUPPLY TOP REGISTER OR GRILLE (WALL TYPE)
- EXHAUST OR RETURN CEILING REGISTER OR GRILLE
- EXHAUST OR RETURN BOTTOM REGISTER OR GRILLE (WALL TYPE)
- EXHAUST OR RETURN REGISTER OR TOP GRILLE (WALL TYPE)
- VANED ELBOW & AIR SPLIT TYPE DUCT TAKE-OFF
- CONNECT NEW DUCT TO EXISTING DUCT
- INCLINED RISE, IN DIRECTION OF AIR FLOW (R)
- INCLINED DROP, IN DIRECTION OF AIR FLOW (D)
- LIMIT OF DEMOLITION
- FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC (FC)
- VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)
- VANED ELBOW (SHORT RADIUS)
- STANDARD RADIUS ELBOW (LONG RADIUS)
- NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH) (10x8)
- EXISTING DUCT TO REMAIN
- EXISTING DUCT TO BE REMOVED
- FLEXIBLE DUCTWORK (INSULATED)
- MANUAL VOLUME DAMPER (VD)
- POINT OF CHANGE IN DUCT CONSTRUCTION BY STATIC PRESSURE CLASS. THE NUMBER ASSIGNS PRESSURE CLASS (IN. OF WATER) WHICH WILL ACCOMMODATE MAXIMUM OPERATING PRESSURE IN THE DUCT SUBSECTION. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS. A "N" SUPERSCRIPT INDICATES NEGATIVE PRESSURE.
- AUTOMATIC CONTROL DAMPER MODULATING
- AUTOMATIC CONTROL DAMPER TWO POSITION
- COMBINATION FIRE/SMOKE DAMPER (F/S DPR)
- MANUAL SPLITTER DAMPER
- STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP) (45° SUPPLY)
- (45° RETURN)
- DUCT MOUNTED COIL (HOT WATER OR STEAM COIL)
- SMOKE DETECTOR - DUCT MOUNTED (SD)
- AIR TERMINAL UNIT WITH INTEGRAL REHEAT COIL
- REHEAT COIL

GENERAL NOTES AND CONDITIONS

1. THESE DRAWINGS WERE PREPARED FROM INFORMATION TAKEN FROM THE AVAILABLE BUILDING DRAWINGS, ARCHITECTURAL BACKGROUNDS PROVIDED BY THE OWNER AND FIELD SURVEY INFORMATION COMPILED BY THE ENGINEERING DESIGN TEAM FOR THE PURPOSE OF ENGINEERING DESIGN. EXISTING CONDITIONS ARE SHOWN AS ACCURATELY AS POSSIBLE. THERE IS THE POSSIBILITY THAT CONDITIONS SHOWN ARE NOT EXACTLY AS EXISTING. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, LOCATIONS, SIZES AND CONDITIONS AT THE SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO BEGINNING INSTALLATION OR FABRICATION WORK.

1.1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW THE PLANS AND SPECIFICATIONS, AS WELL AS ALL RELATED PROJECT PLANS AND SPECIFICATIONS FROM OTHER DISCIPLINES, TO BECOME FAMILIAR WITH THE FULL PROJECT SCOPE AND COORDINATED RESPONSIBILITIES.

1.2. SHOULD IT APPEAR THAT THE WORK INTENDED TO BE DESCRIBED OR RELATED WORK ARE NOT SUFFICIENTLY DETAILED OR EXPLAINED ON THE DRAWINGS, OR IN THE SPECIFICATIONS, CONSULT THE ENGINEER FOR NECESSARY CLARIFICATIONS, AND CONFORM TO THOSE CLARIFICATIONS INSOFAR AS THEY ARE CONSISTENT WITH THE ORIGINAL DRAWINGS AND SPECIFICATIONS. IN NO CASE SHALL WORK PROCEED IN UNCERTAINTY.

1.3. EQUIPMENT ARRANGEMENTS ARE DESIGNED TO SHOW PREFERRED CONFIGURATIONS TO SUIT KNOWN CONDITIONS. ACTUAL INSTALLATION BY CONTRACTOR MAY BE ALTERED AS REQUIRED TO SUIT FIELD CONDITIONS ENCOUNTERED DURING CONSTRUCTION WITHOUT COMPROMISING THE INTENT OF THE ORIGINAL DESIGN. COORDINATE ANY MODIFICATIONS WITH THE ENGINEER AND OWNER PRIOR TO STARTING WORK IN AREAS AFFECTED.

1.4. THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS AT SITE PRIOR TO STARTING WORK.

1.5. DO NOT SCALE DRAWINGS.

2. BIDDERS ARE TO VISIT THE SITE AND FAMILIARIZE THEMSELVES AS THE NATURE AND SCOPE OF THE WORK. THE SUBMISSION OF A BID WILL BE EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND ENSURE THAT ALL ALTERNATE PRICING INFORMATION NOTED WITHIN THE CONSTRUCTION DOCUMENTS HAVE BEEN INCLUDED WITHIN THE ORIGINAL BID SUBMISSION. LATER CLAIMS FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED, OR FOR ANY DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD AN EXAMINATION BEEN MADE, WILL NOT BE ACCEPTED.

3. THE CONTRACTOR WILL BE RESPONSIBLE FOR ENSURING THAT ALL RULES AND REGULATIONS, INCLUDING THOSE WHICH MAY BE ISSUED BY THE OWNER, ARE BEING OBSERVED, PARTICULARLY WORKPLACE SAFETY AND THE CONDUCT OF ALL THOSE EMPLOYED DIRECTLY AND INDIRECTLY ON THE PREMISES, AND THE OWNER'S EMPLOYEES WHO MAY BE IMPACTED OR AFFECTED BY CONSTRUCTION ACTIVITIES. THE CONTRACTOR WILL INSTALL SIGNAGE, BARRIERS, AND OTHER MEANS TO PROVIDE WARNING AND PERSONNEL SAFETY. PLACEMENT OF THESE ITEMS WILL BE COORDINATED WITH THE OWNER AND HIS ONGOING OPERATIONS AND WILL PROMPTLY BE REVISED WHEN WORK IN A PARTICULAR AREA HAS BEEN COMPLETED.

3.1. DURING PERFORMANCE OF WORK, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVISION AND MAINTENANCE OF WARNING SIGNS, LIGHT SIGNAL DEVICES, GUARD LIGHTS, BARRICADES, GUARD RAILS, FENCES AND OTHER DEVICES, APPROPRIATELY LOCATED ON AND AROUND THE JOB SITE WHICH GIVE PROPER AND UNDERSTANDABLE WARNING TO PERSONS WITH REGARD TO HAZARDOUS CONDITIONS, EQUIPMENT AND OPERATIONS BEING PERFORMED IN CONJUNCTION WITH THE WORK.

4. THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH OTHER TRADES FOR ITEMS IN THEIR SCOPE OF WORK WHICH COULD REQUIRE ADDITIONAL MECHANICAL/PLUMBING WORK, AND ITEMS THAT ARE NOT INDICATED ON THE DRAWINGS.

5. THIS INSTALLATION WILL CONFORM TO ALL CODES AND THE REQUIREMENTS OF FEDERAL, STATE, AND LOCAL REGULATORY AGENCIES HAVING JURISDICTION. IN PARTICULAR, THE WORK WILL BE IN ACCORDANCE WITH THE CURRENT ADOPTED EDITION OF THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) AND ALL OF ITS APPLICABLE SUBCODES AND AMENDMENTS.

6. ALL WORK WILL BE LAWFULLY EXECUTED IN A NEAT AND WORKMANLIKE MANNER AND WILL BE COMPLETED IN ACCORDANCE WITH THE GOVERNING CODES (ABOVE), INDUSTRY STANDARDS, AND IN CONFORMANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND REQUIREMENTS.

7. WORK UNDER THIS CONTRACT SHALL CONSIST OF THE CONTRACTOR PROVIDING ALL LABOR, MATERIALS, AND SERVICES, INCLUDING WORK NOT SPECIFICALLY SHOWN BUT REASONABLY IMPLIED. THIS SHALL INCLUDE CUTTING, PATCHING AND RESTORATION OF EXISTING SURFACES DAMAGED DURING THE CONSTRUCTION. CONTRACTOR SHALL ALSO PROVIDE ALL EQUIPMENT SHOWN OR SPECIFIED OR AN APPROVED EQUIVALENT. SUBSTITUTED EQUIPMENT OR MATERIALS SHALL NOT BE INSTALLED UNTIL GIVEN WRITTEN APPROVAL BY THE OWNER.

8. CONTRACTOR SHALL BE RESPONSIBLE FOR COSTS INCURRED FOR NONCOMPLIANCE WITH THESE CONTRACT DOCUMENTS. CONTRACTOR WILL NOT BE ALLOWED CHANGE ORDERS FOR PROBLEMS ARISING FROM NEGLECT OF PROVISIONS INCLUDED IN THESE CONDITIONS.

9. MAINTAIN ORDERLY HOUSEKEEPING DURING CONSTRUCTION, AND UPON SUBSTANTIAL COMPLETION PERFORM FINAL CLEANUP. REMOVE CONSTRUCTION RUBBISH, SCAFFOLDING, EQUIPMENT, TEMPORARY PROTECTION, TEMPORARY FIELD STRUCTURES, AND OTHER MATERIALS OR EQUIPMENT THAT WAS REQUIRED IN CONNECTION WITH THE CONSTRUCTION, BUT NOT A PERMANENT PART THEREOF.

10. THOSE PERFORMING WORK AS A CONTRACTOR MUST EXAMINE SUBSTRATES AND CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND NOTIFY THE CONTRACTOR IN WRITING, OF CONDITIONS DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK. COMMENCEMENT OF WORK BY A TRADE ON A SURFACE OR CONSTRUCTION SHALL IMPLY ACCEPTANCE OF SUCH SURFACE OR CONSTRUCTION. DO NOT PROCEED WITH INSTALLATION UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

11. THE CONTRACTOR SHALL SECURE ALL PERMITS AND APPLICATIONS AND PAY ANY AND ALL FEES AS REQUIRED. THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES AND CERTIFICATES OF INSPECTION REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. DELIVER ALL PERMITS, CERTIFICATES AND APPROVALS TO THE OWNER AGENT PRIOR TO FINAL ACCEPTANCE OF THE WORK. THE CONTRACTOR MUST FILE NECESSARY DRAWINGS, PREPARE DOCUMENTS AND MAKE APPLICATIONS FOR EACH REQUIRE PERMIT AND INSPECTION, PRIOR TO COMMENCING WORK TO AVOID DELAYS DURING CONSTRUCTION.

12. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND MANUFACTURERS DATA SHEETS ON ALL EQUIPMENT AND MATERIALS SPECIFIED ON DRAWINGS FOR APPROVAL BY OWNER OR AGENT FOR THE OWNER. THESE DRAWINGS OR SHEETS SHALL CONTAIN ALL NECESSARY DATA, I.E., MANUFACTURER, CATALOG NUMBER, SIZE, DIMENSIONS, CAPACITY, WIRING DETAILS AND ALL OTHER ENGINEERING DATA AND DETAILS NECESSARY FOR COMPLETE CLARITY AND INSTALLATION.

13. THE CONTRACTOR SHALL KEEP ONE SET OF THE LATEST ISSUE OF DRAWINGS WHICH SHALL REFLECT THE ACTUAL INSTALLED CONDITIONS AND CONNECTIONS OF ALL EQUIPMENT AND DEVICES. THE CONTRACTOR SHALL PROVIDE COPIES OF ALL MAINTENANCE INFORMATION AND INSTRUCTIONS RECEIVED WITH EQUIPMENT AND SYSTEMS. ALL "AS-BUILT" DRAWINGS AND MISCELLANEOUS INFORMATION SHALL BE GIVEN TO THE OWNER AND ENGINEER AT COMPLETION OF WORK. THE CONTRACTOR SHALL GUARANTEE ALL MATERIAL AND LABOR TO BE FREE FROM DEFECTS FOR A ONE YEAR PERIOD FROM THE TIME OF OWNER ACCEPTANCE. ANY DEFECTS OCCURRING DURING THIS PERIOD SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

14. AS DIRECTED BY THE OWNER, ALL EXISTING EQUIPMENT AND MATERIAL IN USABLE CONDITION THAT IS REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER, OR HANDLED AS INSTRUCTED BY THE OWNER, BE DISPOSED OF BY THE CONTRACTOR. ALL MATERIALS DEEMED FOR REMOVAL SHALL BE RECYCLED WHENEVER POSSIBLE, IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH WITHIN SPECIFICATION SECTION 01 74 19 (CONSTRUCTION WASTE MANAGEMENT).

15. CONTRACTOR IS TO PROVIDE ALL REQUIRED SCAFFOLDING, LADDERS, RIGGING, HOISTING AND ALL OTHER EQUIPMENT REQUIRED FOR THE INSTALLATION OF THEIR WORK.

16. ESTABLISH PASSAGE CLEARANCES REQUIRED TO DELIVER, INSTALL AND ERECT ALL REQUIRED EQUIPMENT. IF STRUCTURES, EQUIPMENT AND SYSTEMS MUST BE ALTERED TO PROVIDE PASSAGE OF EQUIPMENT, THE CONTRACTOR SHALL RESTORE STRUCTURES, EQUIPMENT AND SYSTEMS TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE; INCLUDING REMOVING AND REPLACEMENT OF ALL CEILING AS REQUIRED TO COMPLETE THE WORK.

17. EXCAVATION FOR UNDER SLAB OR UNDERGROUND INSTALLATION OF CONDUITS SHALL BE APPROACHED WITH EXTREME CAUTION SO AS NOT TO DAMAGE EXISTING UNDERGROUND PIPING, WIRING AND CONDUITS.

18. THE PLANS SHOW SUBSURFACE STRUCTURES, ABOVEGROUND STRUCTURES, AND /OR UTILITIES FROM FIELD LOCATIONS AND RECORD MAPPING EXACT LOCATION OF WHICH MAY VARY FROM THE LOCATIONS INDICATED. IN PARTICULAR, THE CONTRACTOR IS WARNED THAT THE EXACT OR EVEN APPROXIMATE LOCATION OF SUCH PIPELINES, SUBSURFACES STRUCTURES AND O/ OR UTILITIES IN THE AREA MAY BE DIFFERENT FROM THAT SHOWN OR MAY NOT BE SHOWN, AND IT SHALL BE HIS RESPONSIBILITY TO PROCEED WITH GREAT CARE IN EXECUTING ANY WORK. THE CONTRACTOR IS TO CONTACT VAMC BATH ENGINEERING DEPARTMENT FOR ASSISTANCE IN LOCATING OTHER UNDERGROUND FACILITIES THAT MAY EXIST IN THE PROJECT AREA.

19. THE CONTRACTOR SHALL REVIEW THE CONTRACT FOR CONFLICTS. WHERE CONFLICTS EXIST WITHIN THE DRAWINGS, WORK SHALL NOT PROCEED UNTIL THE ENGINEER HAS BEEN NOTIFIED AND GIVEN DIRECTION.

20. WHERE INCIDENTAL WORK IS REQUIRED TO ACCOMPLISH WORK SHOWN ON THE DRAWINGS, THIS WORK IS IMPLIED AND SHALL BE INCLUDED AS PART OF THE BASE BID.

21 PRIOR TO ANY WORK COMMENCING IN AN AREA, THE CONTRACTOR SHALL NOTIFY THE COTR OF HIS INTENTION TO WORK IN THIS AREA AND SHALL SCHEDULE A WALKTHROUGH WITH THE CORT TO DETERMINE EXISTING CONDITIONS. AFTER THE WORK, THE EXISTING WORK AREA SHALL BE RETURNED TO THEIR ORIGINAL STATE BEFORE FINAL APPROVAL SHALL BE GIVEN.

22. AFTER THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL COMPLETELY CLEAN ALL SURFACES OF CONSTRUCTION DEBRIS. SURFACES SHALL BE WIPED CLEAN OF DUST, INCLUDING FIXTURES, WINDOW SILLS, DOOR FRAMES, ECT.. ANY TOILETS OR SINKS WITHIN THE CONSTRUCTION AREA SHALL BE COMPLETELY CLEANED AFTER THE CONSTRUCTION HAS BEEN COMPLETED USING NATURAL CLEANSER.

23. THE CONTRACTOR SHALL PROVIDE A MINIMUM OF (2) HARD COPIES OF OPERATING AND SERVICE MANUALS FOR EACH MECHANICAL,ELECTRICAL,ELECTRONIC, HVAC, OR OTHER EQUIPMENT INSTALLED AS PART OF THE PROJECT.

HVAC NOTES AND CONDITIONS:

1. ALL HVAC EQUIPMENT SHALL MEET THE REQUIREMENTS SET FORTH IN THE ANSI/ASHRAE/IESNA STANDARD 90.1 ENTITLED "ENERGY STANDARDS FOR BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS".

2. ALL METALLIC DUCTWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH SMACNA STANDARD "HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE", NFPA STANDARD 90A TITLED "INSTALLATION OF AIR CONDITIONING AND VENTILATION SYSTEMS", AND "SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL".
ALL PRIMARY SUPPLY AIR DUCTWORK (UPSTREAM OF VAV BOXES) SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH SMACNA 4 IN WG PRESSURE CLASS, SEAL CLASS A, UNLESS OTHERWISE NOTED. SECONDARY SUPPLY AIR (DOWNSTREAM OF VAV BOXES), RETURN AIR, AND EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA 3 IN WG PRESSURE CLASS, SEAL CLASS B, UNLESS OTHERWISE NOTED.

3. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS. CONTRACTOR SHALL INCREASE THE DUCT SIZE ACCORDINGLY TO COMPENSATE FOR ACOUSTICAL DUCT LINING THICKNESS (UNLESS OTHERWISE NOTED). CONTRACTOR MAY ADJUST DUCT SIZES ACCORDINGLY TO SUIT FIELD CONDITIONS AS LONG AS THE DUCT FREE AREA AND STATIC PRESSURE DROP ARE EQUAL TO THE PROJECT DOCUMENTS.

4. CONTRACTOR SHALL PROVIDE ACCESS DOORS IN DUCTWORK FOR OPERATION, ADJUSTMENT AND MAINTENANCE OF ALL FANS, VALVES, COILS AND MECHANICAL EQUIPMENT.

5. ADEQUATELY SIZED ACCESS PANELS SHOULD BE PROVIDED ON BOTH SIDES OF THE SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, HUMIDIFIERS, COILS AND OTHER DEVICES LOCATED IN THE DUCTWORK WHICH REQUIRE INSPECTION AND/OR MAINTENANCE.

6. CONTRACTOR SHALL PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCT WORK SYSTEMS (SUPPLY, RETURN, VENTILATION AIR AND EXHAUST) CONNECTED TO ALL AIR HANDLING UNITS, FANS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT (UNLESS NOTED OTHERWISE).

7. ALL AIR HANDLING SYSTEMS SHALL BE DESIGNED AND INSTALLED WITH BALANCE DAMPERS LOCATED IN THE MAIN SUPPLY, EXHAUST AND OUTSIDE AIR DUCTS FOR PROPER BALANCING OF EACH SYSTEM, AND FOR EACH SUPPLY, RETURN, OR EXHAUST GRILLE, UNLESS OTHERWISE NOTED.

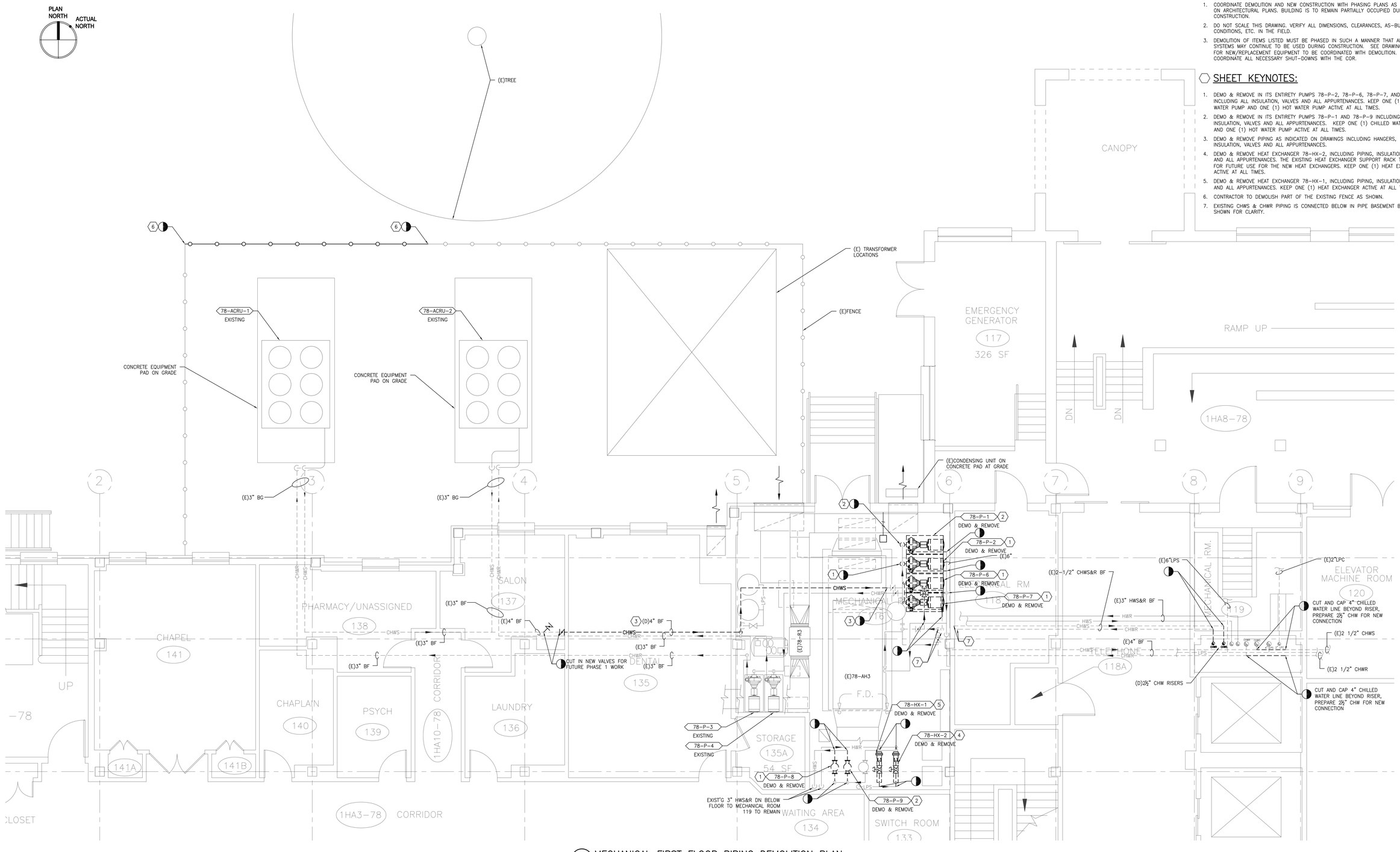
8. DUCTWORK WILL INCLUDE ALL DUCTS, FITTINGS, TURNING VANES, DAMPERS, SUPPORTS, AND ALL ACCESSORIES, S

GENERAL SHEET NOTES:

1. COORDINATE DEMOLITION AND NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
3. DEMOLITION OF ITEMS LISTED MUST BE PHASED IN SUCH A MANNER THAT ALL SYSTEMS MAY CONTINUE TO BE USED DURING CONSTRUCTION. SEE DRAWING MP101 FOR NEW/REPLACEMENT EQUIPMENT TO BE COORDINATED WITH DEMOLITION. COORDINATE ALL NECESSARY SHUT-DOWNS WITH THE COR.

SHEET KEYNOTES:

1. DEMO & REMOVE IN ITS ENTIRETY PUMPS 78-P-2, 78-P-6, 78-P-7, AND 78-P-8 INCLUDING ALL INSULATION, VALVES AND ALL APPURTENANCES. kEEP ONE (1) CHILLED WATER PUMP AND ONE (1) HOT WATER PUMP ACTIVE AT ALL TIMES.
2. DEMO & REMOVE IN ITS ENTIRETY PUMPS 78-P-1 AND 78-P-9 INCLUDING ALL INSULATION, VALVES AND ALL APPURTENANCES. KEEP ONE (1) CHILLED WATER PUMP AND ONE (1) HOT WATER PUMP ACTIVE AT ALL TIMES.
3. DEMO & REMOVE PIPING AS INDICATED ON DRAWINGS INCLUDING HANGERS, INSULATION, VALVES AND ALL APPURTENANCES.
4. DEMO & REMOVE HEAT EXCHANGER 78-HX-2, INCLUDING PIPING, INSULATION, VALVES, AND ALL APPURTENANCES. THE EXISTING HEAT EXCHANGER SUPPORT RACK TO REMAIN FOR FUTURE USE FOR THE NEW HEAT EXCHANGERS. KEEP ONE (1) HEAT EXCHANGER ACTIVE AT ALL TIMES.
5. DEMO & REMOVE HEAT EXCHANGER 78-HX-1, INCLUDING PIPING, INSULATION, VALVES, AND ALL APPURTENANCES. KEEP ONE (1) HEAT EXCHANGER ACTIVE AT ALL TIMES.
6. CONTRACTOR TO DEMOLISH PART OF THE EXISTING FENCE AS SHOWN.
7. EXISTING CHWS & CHWR PIPING IS CONNECTED BELOW IN PIPE BASEMENT BUT NOT SHOWN FOR CLARITY.



1 MECHANICAL FIRST FLOOR PIPING DEMOLITION PLAN
SCALE: 1/4"=1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KOFFEL ASSOCIATES Fire Protection ENGINEERS
8815 CENTRE PARK DRIVE, SUITE 200 COLUMBIA, MD 21045
410-750-2246 (BALT) 410-750-2588 (FAX)
KA PROJECT NUMBER: M023-03

pvl design associates
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Phone: (540) 450-8702
www.pvldesignassociates.com

ARCHITECT/ENGINEERS:

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M.E.P. & Structural Engineering
A Service Disabled Veteran Owned Small Business
1010 KINGS HIGHWAY SOUTH
CHERRY HILL, NEW JERSEY 08034
PHONE: (856)429-4000
FAX: (856)429-5002

SDVOSB CVE

Drawing Title	MECHANICAL FIRST FLOOR PIPING DEMOLITION PLAN
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	PNL
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	MD101
Dwg. 69 of 140	

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231

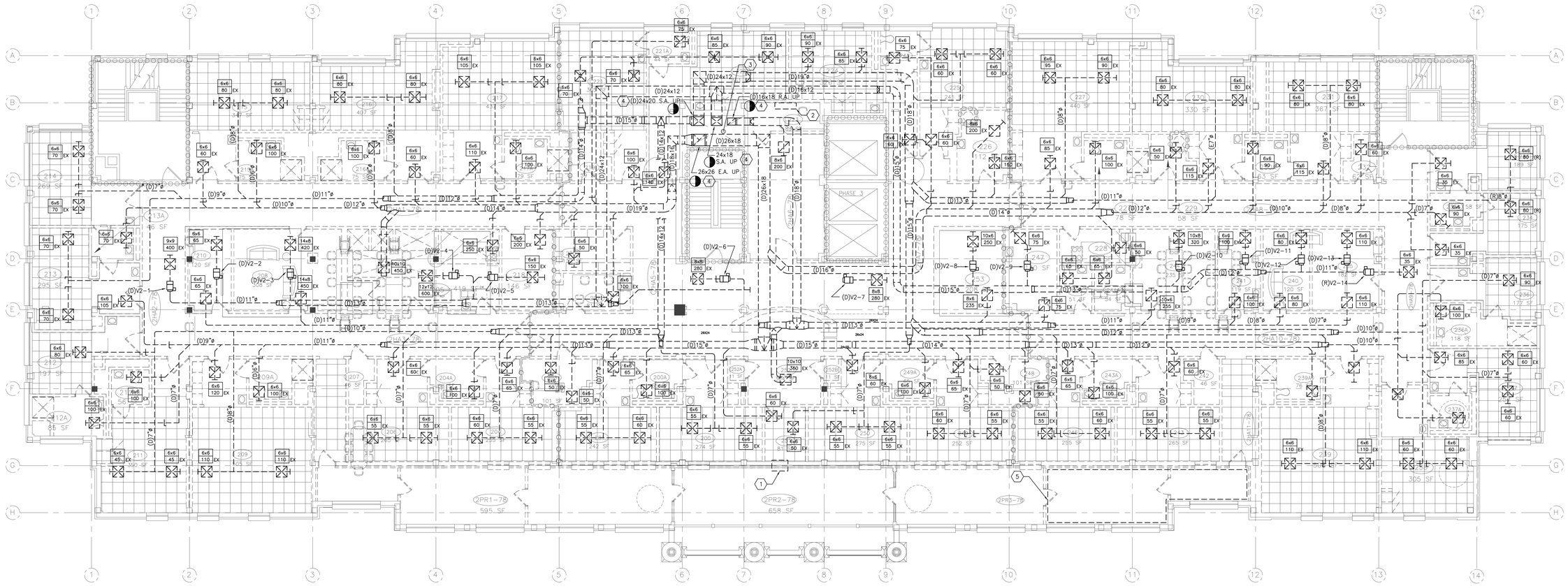
PLAN NORTH
ACTUAL NORTH

GENERAL SHEET NOTES:

1. COORDINATE DEMOLITION AND NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN FIELD.
3. CONTRACTOR SHALL DEMOLISH AND REMOVE SUPPLY, RETURN AND EXHAUST DUCT, HANGERS, REGISTERS, GRILLES, FIRE DAMPERS, THERMOSTATS, FLEX DUCT, VAV BOXES AND ALL APPURTENANCES AS SHOWN.

SHEET KEYNOTES:

1. CONTRACTOR SHALL REMOVE THE THRU-WALL AIR CONDITIONER IN ITS ENTIRETY.
2. CONTRACTOR SHALL REMOVE THE ENTIRE SPLIT SYSTEM INCLUDING THE CONDENSATE PUMP, CONDENSING UNIT (NOT SHOWN), LINE SETS AND ALL APPURTENANCES.
3. EXISTING DUCT SHAFT.
4. CUT AND CAP EXISTING DUCT RISER SO THE 3RD FLOOR AIR DISTRIBUTION WILL REMAIN OPERATIONAL. RE-BALANCE AIR FLOW TO 3RD FLOOR AS FOLLOWS:
   a. 78-AH1; 4225 CFM (3RD FLR)
   b. 78-AH2; 3550 CFM (3RD FLR)
   c. 78-R2; 2070 CFM (3RD FLR)
   d. 78-EF1; 4640 CFM (3RD FLR)
5. CONTRACTOR TO REMOVE ALL MECHANICAL EQUIPMENT INCLUDING DUCT WORK HANGERS, CONTROLS, LOUVERS AND ALL APPURTENANCES ASSOCIATED WITH THE SMOKING ROOM.



1 SECOND FLOOR DUCTWORK DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KA PROJECT NUMBER: M023-03

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CHERRY HILL, NEW JERSEY 08034
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SDVOSB CVE

Drawing Title	MECHANICAL SECOND FLOOR DUCTWORK DEMOLITION PLAN
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	MPS
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	MD102
Dwg. 70 of 140	

Office of Construction and Facilities Management
Department of Veterans Affairs

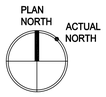
VA FORM 08-6231

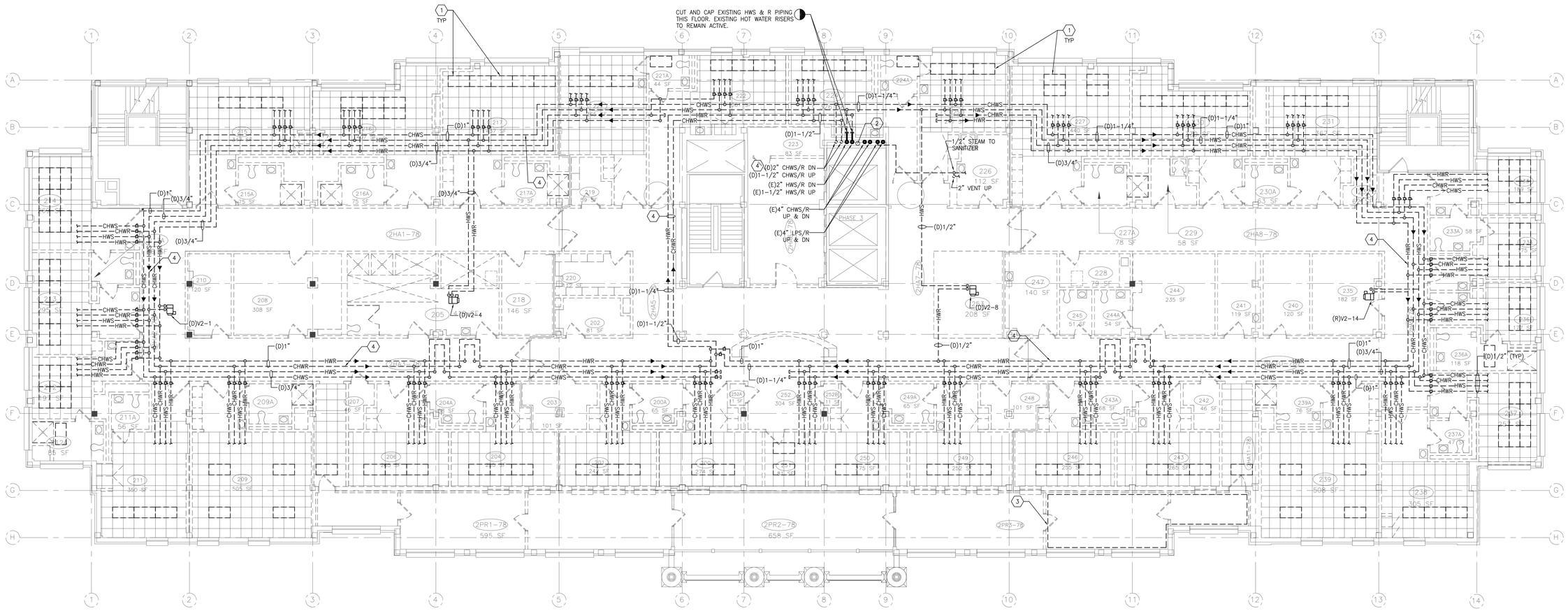
GENERAL SHEET NOTES:

1. COORDINATE DEMOLITION AND NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
3. DEMO & REMOVE ALL PIPING AS INDICATED ON DRAWINGS INCLUDING HANGERS, INSULATION, VALVES, AND ALL APPURTENANCES.
4. ALL TERMINAL DEVICES SHALL BE DEMOLISHED ENTIRELY, INCLUDING ALL VALVES, COMPONENTS, INSTRUMENTATION, CONTROLS AND APPURTENANCES.

SHEET KEYNOTES:

1. CONTRACTOR TO REMOVE ALL RADIANT PANELS AND ALL APPURTENANCES.
2. EXISTING PIPE CHASE.
3. CONTRACTOR TO REMOVE ALL MECHANICAL EQUIPMENT INCLUDING PIPING HANGERS, CONTROLS, VALVES AND ALL APPURTENANCES ASSOCIATED WITH THE SMOKING ROOM.
4. DEMOLISH ALL PIPING, HANGERS, VALVES, INSULATION AND APPURTENANCES.





1 SECOND FLOOR PIPING DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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410-750-2246 (BALTI) 410-750-2588 (FAX)
KA PROJECT NUMBER: M023-03

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ARCHITECT/ENGINEERS:

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M.E.P. & Structural Engineering
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1010 KINGS HIGHWAY SOUTH
CHERRY HILL, NEW JERSEY 08034
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FAX: (856)429-5002

SDVOSB CVE

Drawing Title: MECHANICAL SECOND FLOOR PIPING DEMOLITION PLAN

Approved: Project Director

Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: MPS

Project Number: 528-A6-13-602

Building Number: BLDG. #78

Drawing Number: MD103

Dwg. 71 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

PLAN NORTH

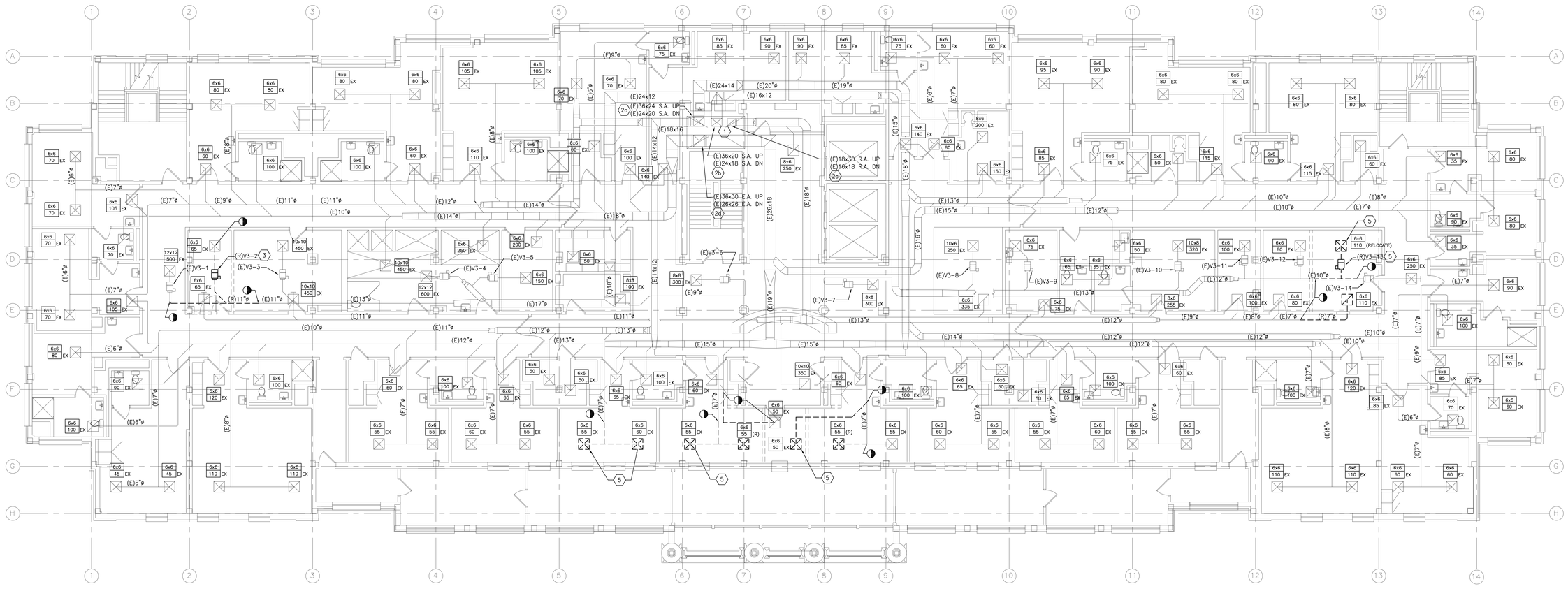
ACTUAL NORTH

GENERAL SHEET NOTES:

1. COORDINATE DEMOLITION AND NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. UNLESS NOTED OTHERWISE, SYSTEMS SHOWN ON THIS DRAWING SHALL REMAIN INTACT AND FUNCTION AT CURRENT CAPACITY THROUGHOUT DEMOLITION AND FOLLOWING NEW CONSTRUCTION.
3. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, AS-BUILT CONDITIONS, CLEARANCES, ETC. IN THE FIELD.

SHEET KEYNOTES:

1. EXISTING DUCT SHAFT
2. CUT AND CAP EXISTING DUCT RISER AT 2ND FLOOR PENETRATION SO THE 3RD FLOOR WILL REMAIN OPERATIONAL. RE-BALANCE AIR FLOW TO 3RD FLOOR AS FOLLOWS:
   a. 78-AH1; 4225 CFM (3RD FLR)
   b. 78-AH2; 3550 CFM (3RD FLR)
   c. 78-R2; 2070 CFM (3RD FLR)
   d. 78-EF1; 4640 CFM (3RD FLR)
3. RELOCATE (R)V3-2 TO AVOID THE NEW SHAFT. REFERENCE DRAWING MH103 FOR (N)WORK. MATCH EXISTING DUCT SIZES WHEN RECONNECTING.
4. RELOCATE (R)V3-13 TO AVOID THE NEW SHAFT.REFERENCE DRAWING MH103 FOR (N)WORK. MATCH EXISTING DUCT SIZES WHEN RECONNECTING.
5. RELOCATE (R)CEILING DIFFUSERS TO NEW LOCATIONS AS SHOWN ON DWG MH103.



1 THIRD FLOOR DUCTWORK DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KA PROJECT NUMBER: M023-03

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SDVOSB CVE

Drawing Title: MECHANICAL THIRD FLOOR DUCTWORK DEMOLITION PLAN

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: MPS

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

Drawing Number: MD104

Dwg. 72 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

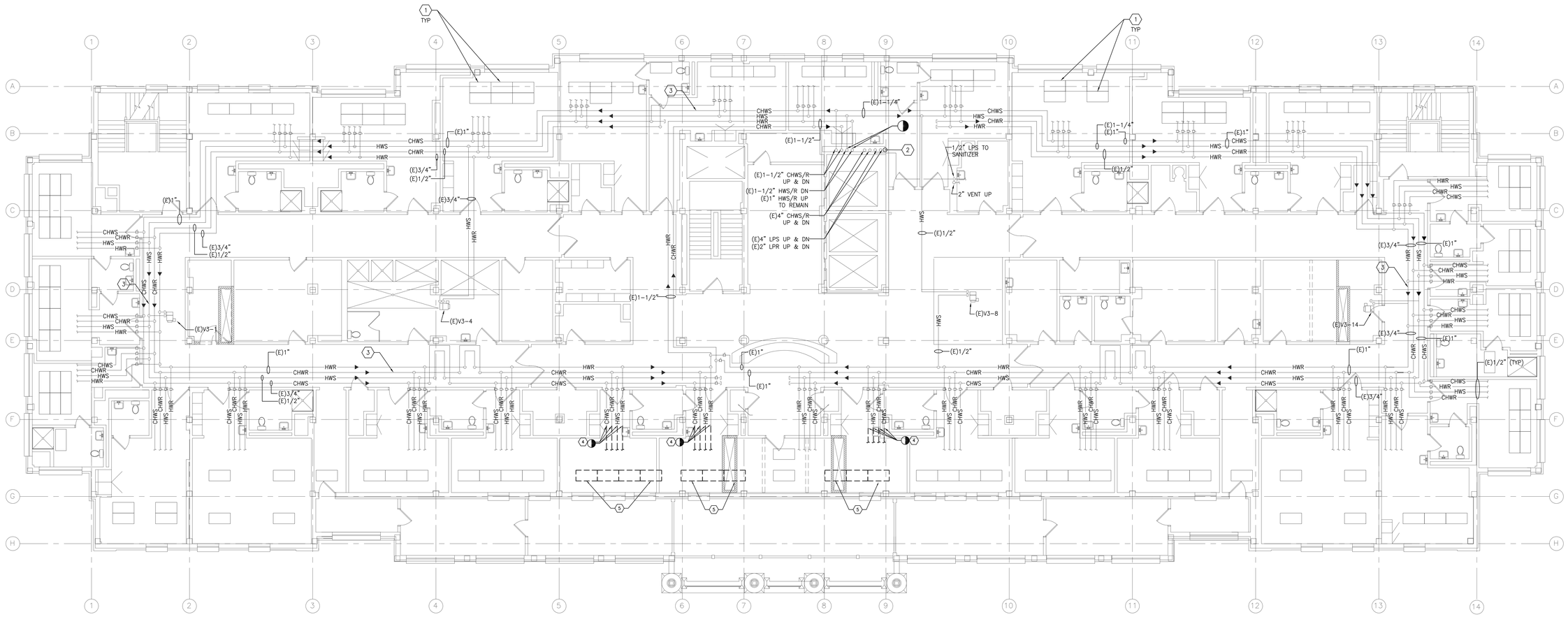
PLAN NORTH
ACTUAL NORTH

GENERAL SHEET NOTES:

1. COORDINATE DEMOLITION AND NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. UNLESS NOTED OTHERWISE, SYSTEMS SHOWN ON THIS DRAWING SHALL REMAIN INTACT AND FUNCTION AT CURRENT CAPACITY THROUGHOUT DEMOLITION AND FOLLOWING NEW CONSTRUCTION.
3. DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
4. DEMO & REMOVE ALL PIPING AS INDICATED ON DRAWINGS INCLUDING HANGERS, INSULATION, VALVES, AND ALL APPURTENANCES.

SHEET KEYNOTES:

1. EXISTING RADIANT CEILING PANELS.
2. EXISTING PIPE CHASE.
3. EXISTING HOT AND CHILLED WATER PIPING ABOVE CEILING.
4. DISCONNECT CHWS/R AND HWS/R FROM RADIANT PANELS AS INDICATED. REFERENCE DRAWING MP103 FOR (N)WORK.
5. RELOCATE (R)RADIANT PANELS TO NEW LOCATIONS. REFERENCE DRAWING MP-103 FOR (N)WORK.



1 MECHANICAL THIRD FLOOR PIPING DEMOLITION PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KA PROJECT NUMBER: MD23-03

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M.E.P. & Structural Engineering
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CHERRY HILL, NEW JERSEY 08034
PHONE: (856)428-4000
FAX: (856)429-5002
SDVOSB CVE

Drawing Title: MECHANICAL THIRD FLOOR PIPING DEMOLITION PLAN

Approved: Project Director

Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: PNL | Drawn: MPS

Project Number: 528-A6-13-602

Building Number: BLDG. #78

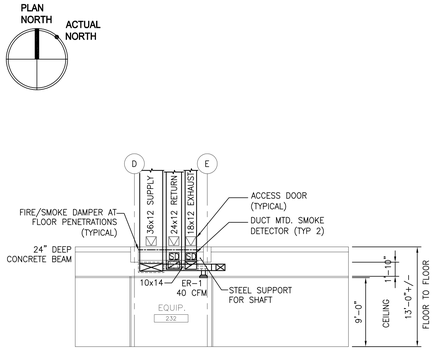
Drawing Number: MD105

Dwg. 73 of 140

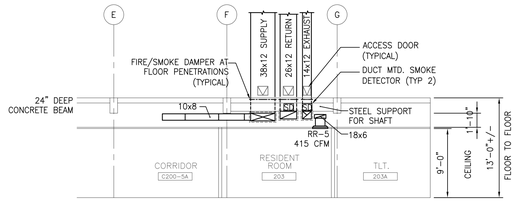
Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



2 MECHANICAL–SECTION
SCALE: NA



3 MECHANICAL–SECTION
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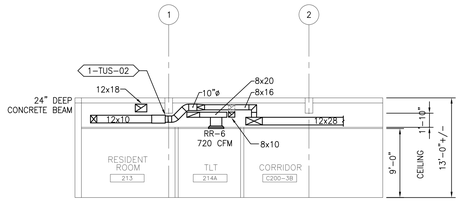
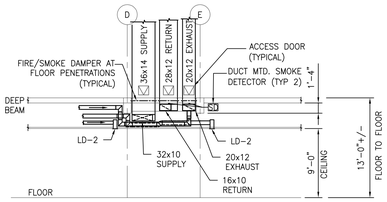


4 MECHANICAL–SECTION
SCALE: NA



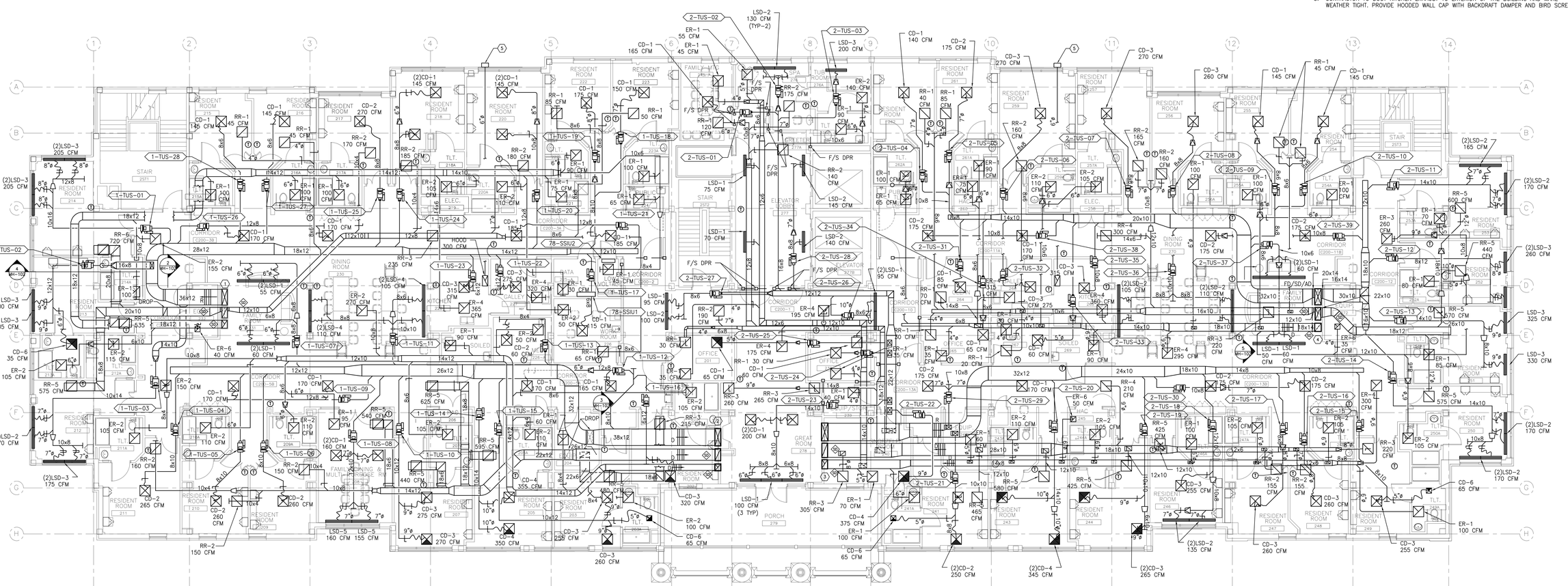
5 MECHANICAL–SECTION
SCALE: NA

GENERAL SHEET NOTES:

1. COORDINATE NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. THIS PLAN INDICATES LOCATION OF SMOKE DETECTORS AND SMOKE DAMPERS. CONTRACTOR TO INSTALL SMOKE DETECTORS AND SMOKE DAMPERS AS INDICATED ON THE DETAILS SHEET.
3. ALL BRANCH DUCT WORK SHALL BE INSTALLED WITH A VOLUME DAMPER.
4. PROVIDE ACCESS PANELS ON BOTH SIDES OF ALL SMOKE DAMPERS, FIRE DAMPERS AND SMOKE DETECTORS PER THE VA STANDARDS.
5. COORDINATE ALL TERMINAL UNITS, DAMPERS AND CONTROLS WITH CEILING ACCESS PANEL LOCATIONS.
6. CONTRACTOR TO COORDINATE PATIENT LIFT TRACK SUPPORTS WITH MECHANICAL SYSTEM.
7. CONTRACTOR MAY CHOOSE TO INSTALL BRANCH TAKE OFFS EITHER FROM THE TOP OF THE DUCT MAIN OR THE BOTTOM BASED ON THE REQUIREMENTS OF THE SPACES AND BUILDING CONSTRAINTS.
8. CONTRACTOR TO COORDINATE DUCT WORK WITH ELECTRICAL CABLE TRAY. REFER TO ELECTRICAL DRAWINGS.
9. SUPPLY DUCT RUNOUT TO VAV BOXES SHALL BE EQUAL IN SIZE TO THE VAV BOX INLET CONNECTION UNLESS NOTED OTHERWISE. PROVIDE DUCT TRANSITION FROM VAV BOX TO SPECIFIED DUCT SIZES AT VAV BOX OUTLET AS REQUIRED.
10. CONTRACTOR TO REFER TO THE ARCHITECTS CODE PLAN DRAWING FOR ALL FIRE SMOKE RATINGS. PROVIDE UL LISTED FIRE STOP ASSEMBLY FOR ALL DUCT WORK PENETRATING ROOMS AND CORRIDORS.
11. THE CONTRACTOR IS RESPONSIBLE FOR TRANSITIONING FROM SQUARE TO ROUND DUCT EVEN IF NOT SHOWN ON PLANS.

SHEET KEYNOTES:

1. THE SUPPLY DUCT DROP FROM ABOVE IS 36x12, THE RETURN DUCT DROP IS 24x12 AND THE EXHAUST DROP IS 18x12 AT THIS LOCATION. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT 3RD FLOOR PENETRATION.
2. THE SUPPLY DUCT DROP FROM ABOVE IS 38X12, THE RETURN DUCT DROP IS 26X12 AND THE EXHAUST DROP IS 14X12 AT THIS LOCATION. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT 3RD FLOOR PENETRATION.
3. THE SUPPLY DUCT DROP FROM ABOVE IS 40X14, THE RETURN DUCT DROP IS 32X12 AND THE EXHAUST DROP IS 20X12 AT THIS LOCATION. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT 3RD FLOOR PENETRATION.
4. THE SUPPLY DUCT DROP FROM ABOVE IS 36x14, THE RETURN DUCT DROP IS 28x12 AND THE EXHAUST DROP IS 18x14. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT 3RD FLOOR PENETRATION.
5. CONTRACTOR TO DUCT KITCHEN EXHAUST TO EXTERIOR OF THE BUILDING AND MAKE WEATHER TIGHT. PROVIDE HOODED WALL CAP WITH BACKDRAFT DAMPER AND BIRD SCREEN.



1 SECOND FLOOR DUCTWORK PLAN
SCALE: 1/8"=1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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FAX: (856)429-5002

SDVOSB VetCert

Drawing Title: MECHANICAL SECOND FLOOR DUCT WORK PLAN

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JS | Drawn: MS

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

Drawing Number: MH102

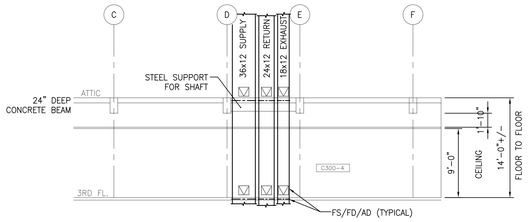
Dwg. 74 of 140

Office of Construction and Facilities Management

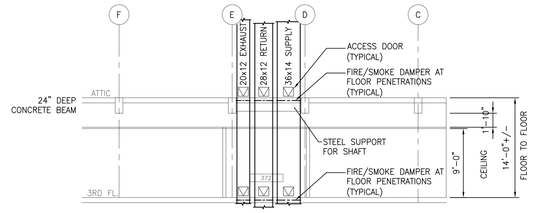
Department of Veterans Affairs

VA FORM 08-6231

PLAN NORTH
ACTUAL NORTH



2 MECHANICAL-SECTION
SCALE: NA



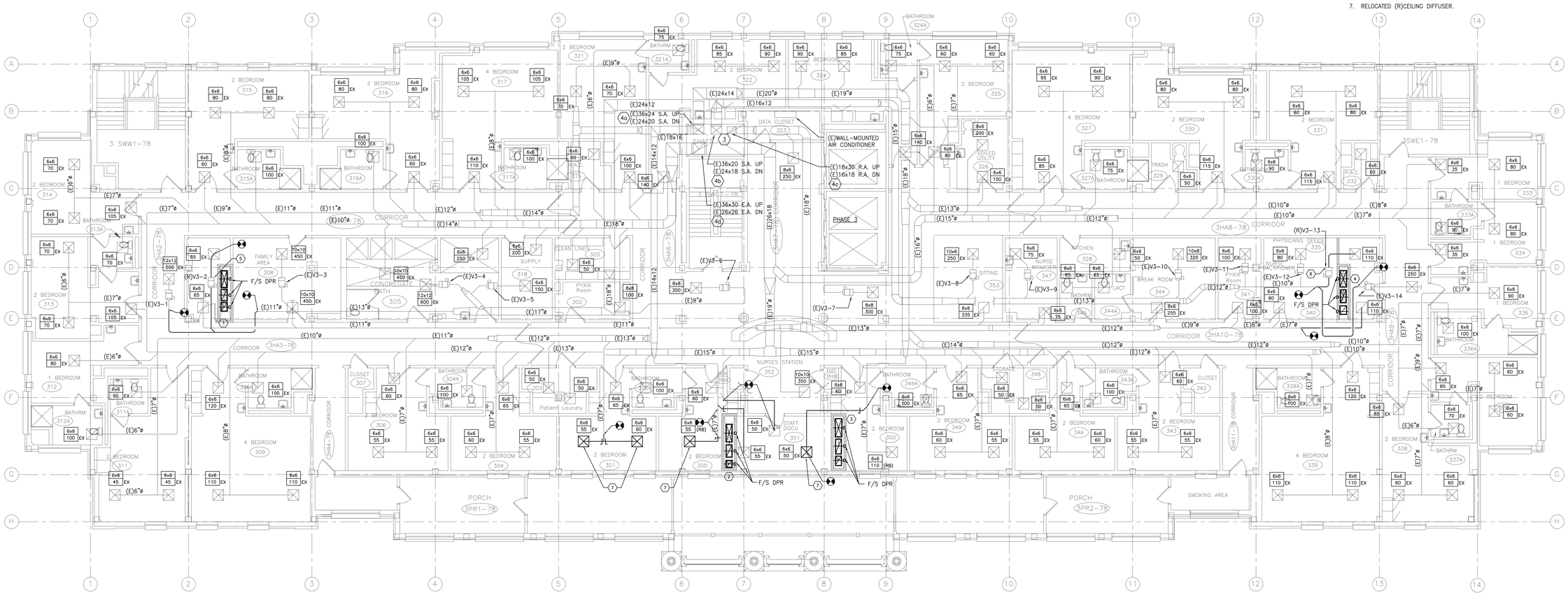
3 MECHANICAL-SECTION
SCALE: NA

GENERAL SHEET NOTES:

1. COORDINATE NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. THIS PLAN INDICATES GENERAL LOCATION OF SMOKE DETECTORS AND SMOKE DAMPERS. CONTRACTOR TO INSTALL SMOKE DETECTORS AND SMOKE DAMPERS AS INDICATED ON THE DETAILS SHEET.
3. ALL BRANCH DUCT WORK SHALL BE INSTALLED WITH A VOLUME DAMPER.
4. PROVIDE ACCESS PANELS ON BOTH SIDES OF ALL SMOKE DAMPERS, FIRE DAMPERS AND SMOKE DETECTORS PER THE VA STANDARDS.
5. COORDINATE ALL TERMINAL UNITS, DAMPERS AND CONTROLS WITH CEILING ACCESS PANEL LOCATIONS.
6. CONTRACTOR TO COORDINATE PATIENT LIFT TRACK SUPPORTS WITH MECHANICAL SYSTEM.
7. CONTRACTOR MAY CHOOSE TO INSTALL BRANCH TAKE OFFS EITHER FROM THE TOP OF THE DUCT MAIN OR THE BOTTOM BASED ON THE REQUIREMENTS OF THE SPACES AND BUILDING CONSTRAINTS.
8. CONTRACTOR TO COORDINATE DUCT WORK WITH ELECTRICAL CABLE TRAY. REFER TO ELECTRICAL DRAWINGS.
9. SUPPLY DUCT RUNOUT TO VAV BOXES SHALL BE EQUAL IN SIZE TO THE VAV BOX INLET CONNECTION UNLESS NOTED OTHERWISE. PROVIDE DUCT TRANSITION FROM VAV BOX TO SPECIFIED DUCT SIZES AT VAV BOX OUTLET AS REQUIRED.
10. CONTRACTOR TO REFER TO THE ARCHITECTS CODE PLAN DRAWING FOR ALL FIRE SMOKE RATINGS. PROVIDE UL LISTED FIRE STOP ASSEMBLY FOR ALL DUCT WORK PENETRATING ROOMS AND CORRIDORS.
11. THE CONTRACTOR IS RESPONSIBLE FOR TRANSITIONING FROM SQUARE TO ROUND DUCT EVEN IF NOT SHOWN ON PLANS.

SHEET KEYNOTES:

1. 36x12 SUPPLY DUCT, 24x12 RETURN DUCT, AND 18x12 EXHAUST DUCT UP AND DOWN. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT ATTIC FLOOR AND 3RD FLOOR PENETRATIONS.
2. 38x12 SUPPLY DUCT, 26x12 RETURN DUCT, AND 14x12 EXHAUST DUCT UP AND DOWN. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT ATTIC FLOOR AND 3RD FLOOR PENETRATIONS.
3. 40x14 SUPPLY DUCT, 32x12 RETURN DUCT, AND 20x12 EXHAUST DUCT UP AND DOWN. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT ATTIC FLOOR AND 3RD FLOOR PENETRATIONS.
4. 36x14 SUPPLY DUCT, 28x12 RETURN DUCT, AND 18x14 EXHAUST DUCT UP AND DOWN. PROVIDE COMBINATION FIRE/SMOKE DAMPER AND ACCESS DOOR AT ATTIC FLOOR AND 3RD FLOOR PENETRATIONS.
5. RELOCATE (R)V3-2 TO NEW LOCATION AS SHOWN.
6. RELOCATE (R)V3-13 TO NEW LOCATION AS SHOWN.
7. RELOCATED (R)CEILING DIFFUSER.



1 THIRD FLOOR DUCTWORK PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KOFFEL ASSOCIATES Fire Protection ENGINEERS®
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KA PROJECT NUMBER: M023-03

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ARCHITECT/ENGINEERS:

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1010 KINGS HIGHWAY SOUTH
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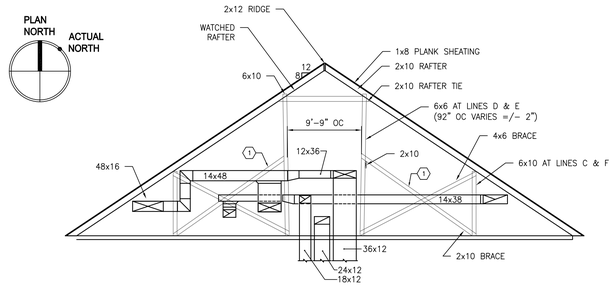
PHONE: (856)429-4000
FAX: (856)429-5002
SDVOSB CVE

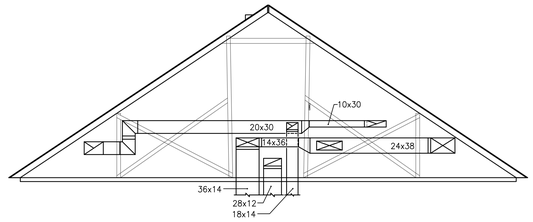
Drawing Title	MECHANICAL THIRD FLOOR DUCTWORK WORK PLAN
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JS
Drawn	PNL
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	MH103
Dwg. 75 of 140	

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



2 MECHANICAL– ATTIC SECTION
SCALE: 1/8" = 1'-0"



3 MECHANICAL– ATTIC SECTION
SCALE: 1/8" = 1'-0"

AIR BALANCING SCHEDULE

AHU	AIR FLOW (CFM)					
	SUPPLY		MIN OA		RETURN	
	2ND FL	3RD FL	2ND FL	3RD FL	2ND FL	3RD FL
AHU-1	10,000	10,045	3,635	3,635	6,365	6,410
AHU-2	12,470	13,015	4,575	4,575	7,895	8,440

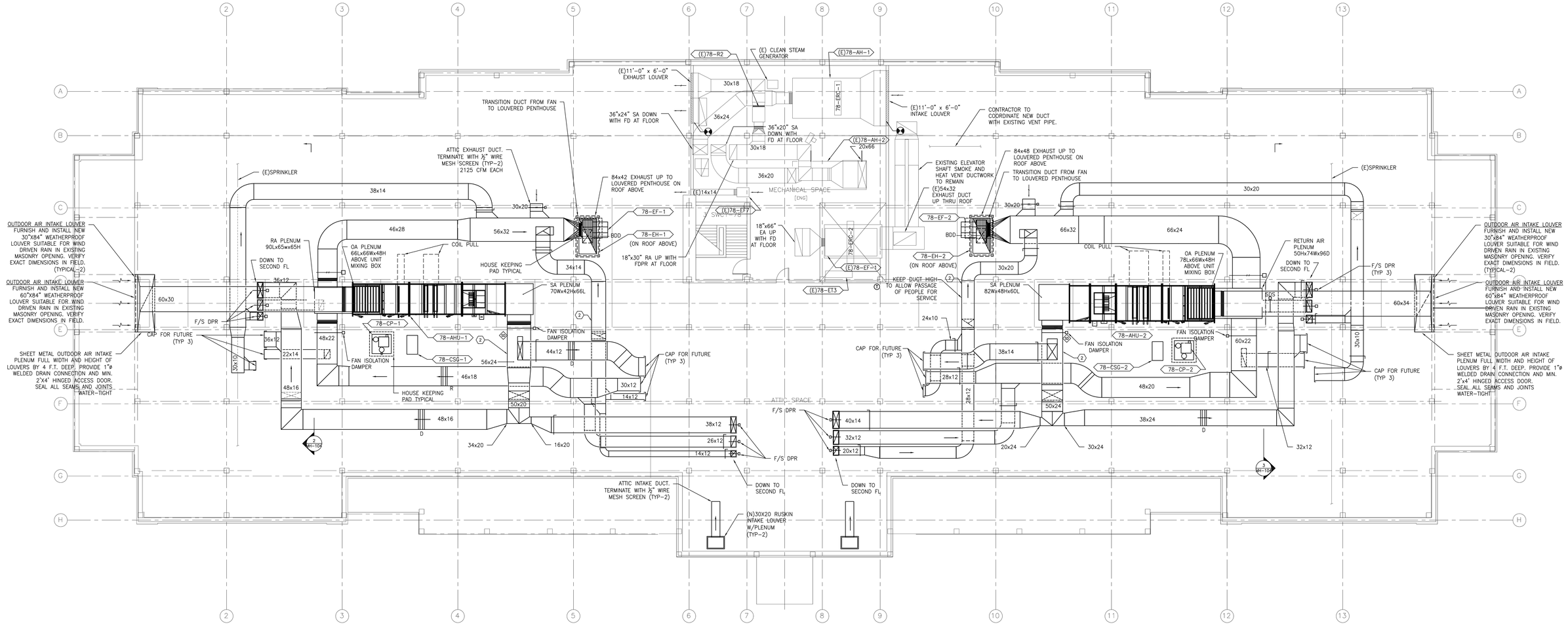
NOTE
1. 3RD FLOOR AIRFLOW INDICATES FUTURE AIR DISTRIBUTION.

GENERAL SHEET NOTES:

1. COORDINATE NEW CONSTRUCTION WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. EXISTING HVAC EQUIPMENT ON THIS FLOOR SHALL REMAIN IN SERVICE. EXISTING EQUIPMENT SHALL BE DEDICATED TO SERVE THE 3RD FLOOR ONLY. RE–BALANCE AIR HANDLING EQUIPMENT, THIS FLOOR, FOR OPERATION DURING SECOND FLOOR CONSTRUCTION AS FOLLOWS:
   1.a. 78–AH1; FROM 8450 CFM TO 4225 CFM
   1.b. 78–AH2; FROM 6960 CFM TO 3550 CFM
   1.c. 78–R2; FROM 4000 CFM TO 2070 CFM
   1.d. 78–EF1; FROM 11410 CFM TO 4640 CFM
2. THIS PLAN INDICATES GENERAL LOCATION OF SMOKE DETECTORS AND SMOKE DAMPERS AND FIRE DAMPERS. CONTRACTOR TO INSTALL SMOKE DETECTORS AND SMOKE DAMPERS AS INDICATED ON THE DETAILS SHEET.
3. ALL BRANCH DUCT WORK SHALL BE INSTALLED WITH A VOLUME DAMPER.
4. PROVIDE ACCESS PANELS ON BOTH SIDES OF ALL SMOKE DAMPERS, FIRE DAMPERS AND SMOKE DETECTORS PER THE VA STANDARDS.
5. PROVIDE 6" OF BATT INSULATION BELOW AHU–1 AND AHU–2.

SHEET KEYNOTES:

1. CONTRACTOR TO REMOVE AND REPLACE CROSS BRACING, REFERENCE STRUCTURAL DRAWING FOR REPAIR METHOD.
2. INSTALL DUCT WORK HIGH TO ALLOW PASSAGE OF SERVICE PERSONAL AND EQUIPMENT.
3. BLANK OFF UNUSED PORTION OF PLENUM. CONTRACTOR TO MAKE WEATHER TIGHT SEAL.



1 MECHANICAL– ATTIC PLAN
SCALE: 1/8" = 1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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SDVOSB 1 VetBiz

Drawing Title: MECHANICAL ATTIC DUCTWORK WORK PLAN

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JS | Drawn: PNL

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

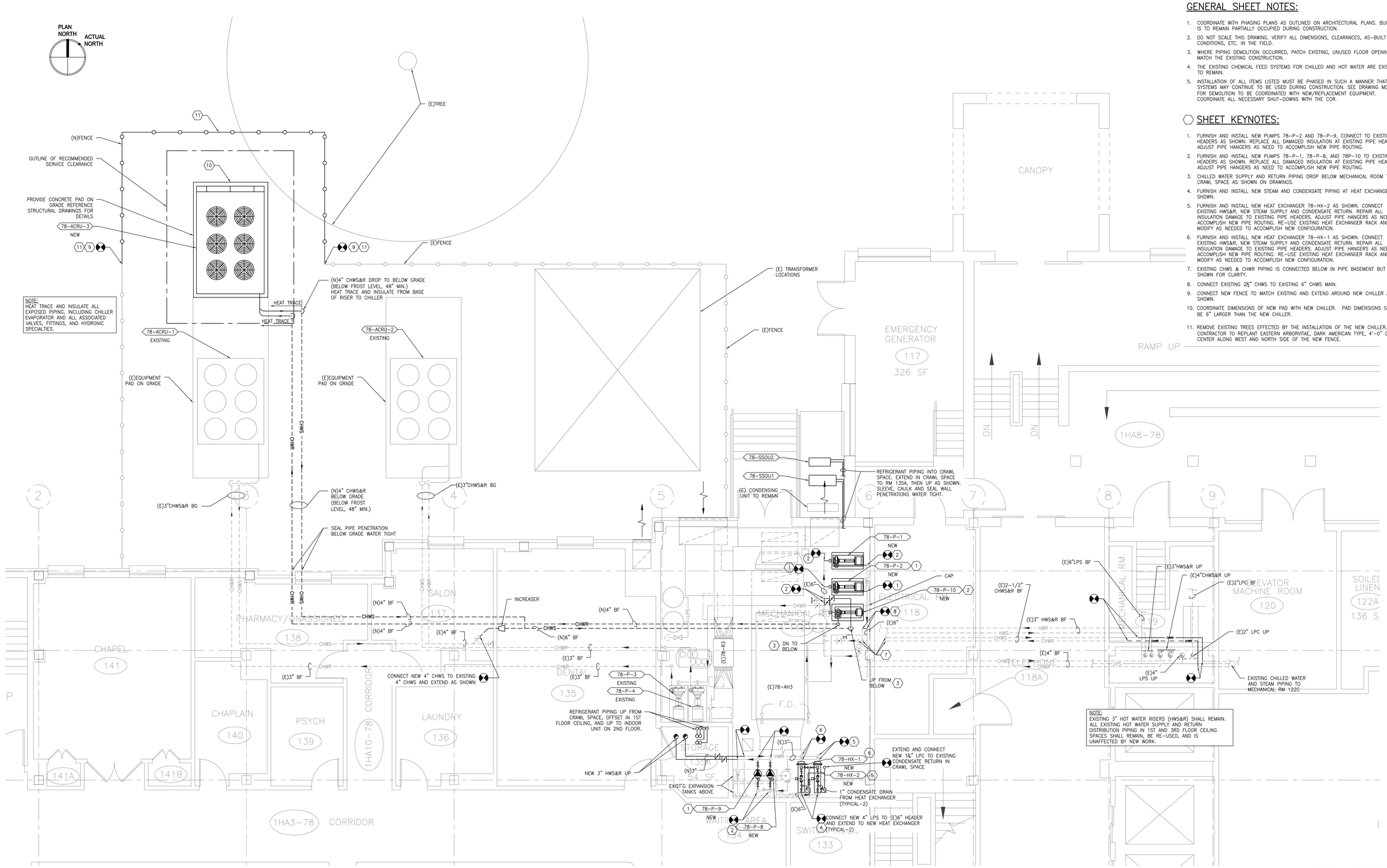
Drawing Number: MH104

Dwg. 76 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 PARTIAL FIRST FLOOR PLAN – PIPING
SCALE: 1/4"=1'-0"

GENERAL SHEET NOTES:

1. COORDINATE WITH PHASING PLANS AS OUTLINED ON ARCHITECTURAL PLANS. BUILDING IS TO REMAIN PARTIALLY OCCUPIED DURING CONSTRUCTION.
2. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
3. WHERE PIPING DEMOLITION OCCURRED, PATCH EXISTING, UNUSED FLOOR OPENINGS TO MATCH THE EXISTING CONSTRUCTION.
4. THE EXISTING CHEMICAL FEED SYSTEMS FOR CHILLED AND HOT WATER ARE EXISTING TO REMAIN.
5. INSTALLATION OF ALL ITEMS LISTED MUST BE PHASED IN SUCH A MANNER THAT ALL SYSTEMS MAY CONTINUE TO BE USED DURING CONSTRUCTION. SEE DRAWING MD101 FOR DEMOLITION TO BE COORDINATED WITH NEW/REPLACEMENT EQUIPMENT. COORDINATE ALL NECESSARY SHUT-DOWNS WITH THE COR.

SHEET KEYNOTES:

1. FURNISH AND INSTALL NEW PUMPS 78-P-2 AND 78-P-9, CONNECT TO EXISTING HEADERS AS SHOWN. REPLACE ALL DAMAGED INSULATION AT EXISTING PIPE HEADERS. ADJUST PIPE HANGERS AS NEED TO ACCOMPLISH NEW PIPE ROUTING.
2. FURNISH AND INSTALL NEW PUMPS 78-P-1, 78-P-8, AND 78P-10 TO EXISTING HEADERS AS SHOWN. REPLACE ALL DAMAGED INSULATION AT EXISTING PIPE HEADERS. ADJUST PIPE HANGERS AS NEED TO ACCOMPLISH NEW PIPE ROUTING.
3. CHILLED WATER SUPPLY AND RETURN PIPING DROP BELOW MECHANICAL ROOM TO CRAWL SPACE AS SHOWN ON DRAWINGS.
4. FURNISH AND INSTALL NEW STEAM AND CONDENSATE PIPING AT HEAT EXCHANGERS AS SHOWN.
5. FURNISH AND INSTALL NEW HEAT EXCHANGER 78-HX-2 AS SHOWN. CONNECT EXISTING HWS&R, NEW STEAM SUPPLY AND CONDENSATE RETURN. REPAIR ALL INSULATION DAMAGE TO EXISTING PIPE HEADERS. ADJUST PIPE HANGERS AS NEED TO ACCOMPLISH NEW PIPE ROUTING. RE-USE EXISTING HEAT EXCHANGER RACK AND MODIFY AS NEEDED TO ACCOMPLISH NEW CONFIGURATION.
6. FURNISH AND INSTALL NEW HEAT EXCHANGER 78-HX-1 AS SHOWN. CONNECT EXISTING HWS&R, NEW STEAM SUPPLY AND CONDENSATE RETURN. REPAIR ALL INSULATION DAMAGE TO EXISTING PIPE HEADERS. ADJUST PIPE HANGERS AS NEED TO ACCOMPLISH NEW PIPE ROUTING. RE-USE EXISTING HEAT EXCHANGER RACK AND MODIFY AS NEEDED TO ACCOMPLISH NEW CONFIGURATION.
7. EXISTING CHWS & CHWR PIPING IS CONNECTED BELOW IN PIPE BASEMENT BUT NOT SHOWN FOR CLARITY.
8. CONNECT EXISTING 2½" CHWS TO EXISTING 6" CHWS MAIN.
9. CONNECT NEW FENCE TO MATCH EXISTING AND EXTEND AROUND NEW CHILLER AS SHOWN.
10. COORDINATE DIMENSIONS OF NEW PAD WITH NEW CHILLER. PAD DIMENSIONS SHALL BE 6" LARGER THAN THE NEW CHILLER.
11. REMOVE EXISTING TREES EFFECTED BY THE INSTALLATION OF THE NEW CHILLER. CONTRACTOR TO REPLANT EASTERN ARBORVITAE, DARK AMERICAN TYPE, 4'-0" ON CENTER ALONG WEST AND NORTH SIDE OF THE NEW FENCE.

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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40 Wildbriar Road, Rochester NY 14623
585-321-1210 www.gardnerplus.com

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KA PROJECT NUMBER: M023-03

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CHERRY HILL, NEW JERSEY 08034
PHONE: (856)429-4000
FAX: (856)429-5002
SDVOSB CVE

Drawing Title	MECHANICAL FIRST FLOOR PIPING WORK PLAN
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	PNL
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	MP101
Dwg. 77 of 140	

Office of Construction and Facilities Management
Department of Veterans Affairs

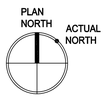
VA FORM 08-6231

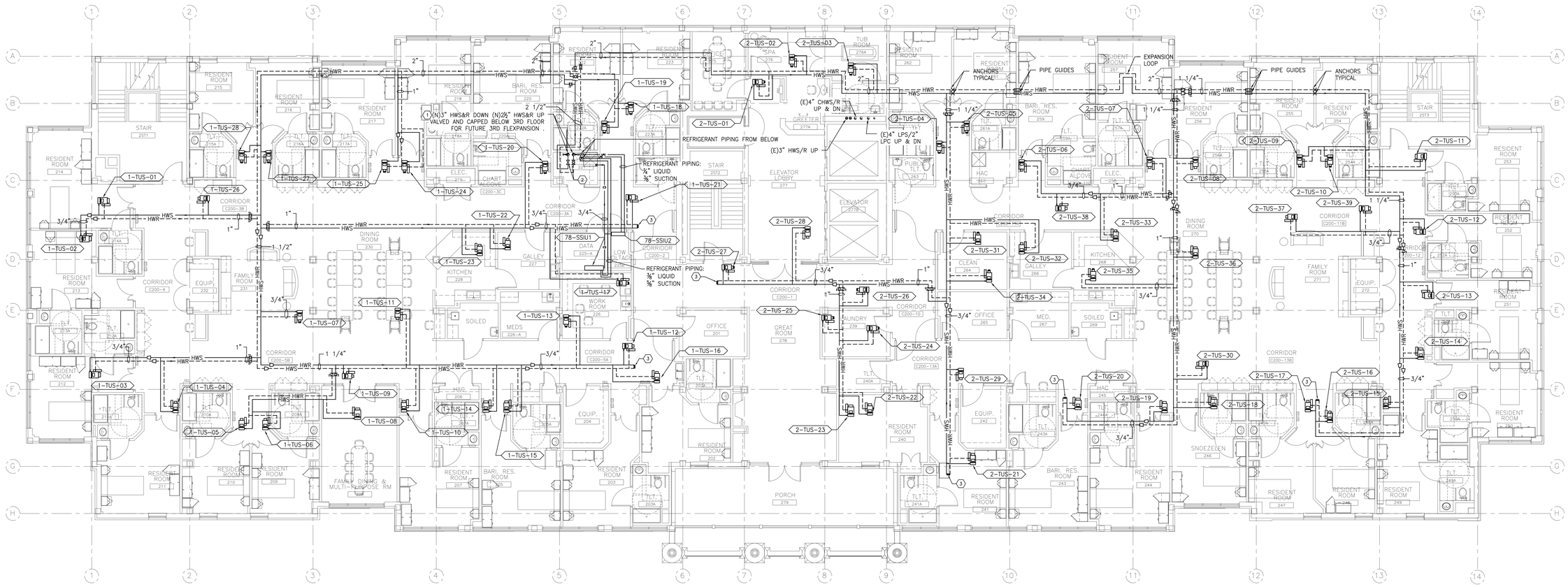
GENERAL SHEET NOTES:

1. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
2. COORDINATE ALL EQUIPMENT, VALVES AND CONTROLS WITH CEILING ACCESS PANEL LOCATIONS.
3. CONTRACTOR TO COORDINATE PATIENT LIFT TRACK SUPPORTS WITH MECHANICAL SYSTEM.
4. ALL PIPING TO BE 3/4" UNLESS NOTED OTHERWISE.
5. PROVIDE U.L. LISTED FIRE STOP ASSEMBLY AT ALL PIPE PENETRATIONS OF FLOORS, SHAFT WALLS, AND FIRE/SMOKE RATED ASSEMBLIES.

SHEET KEYNOTES:

1. VALVE & CAP ABOVE PIPING TAKE OFF FOR SECOND FLOOR FOR FUTURE EXPANSION TO 3RD FLOOR.
2. INSTALL SHUT OFF AND BALANCING VALVES FOR HOT WATER SUPPLY AND RETURN IN ROOM 221 HAC.
3. PROVIDE BALANCING VALVE, SET TO 0.5 GPM (ADJUSTABLE). (TYPICAL)





1 MECHANICAL–SECOND FLOOR PIPING PLAN
SCALE:

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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KOFFEL ASSOCIATES Fire Protection ENGINEERS
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KA PROJECT NUMBER: M023-03

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FAX: (856)429-0002

SDVOSB CVE

Drawing Title: MECHANICAL SECOND FLOOR PIPING WORK PLAN	Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER	Project Number: 528-A6-13-602	Office of Construction and Facilities Management
Approved: Project Director	Location: VAMC, BATH, NEW YORK	Building Number: BLDG. #78	
	Date: 08-06-2015 / Checked: JS / Drawn: MS	Drawing Number: MP102	Department of Veterans Affairs
		Dwg. 78 of 140	

VA FORM 08-6231

PLAN NORTH

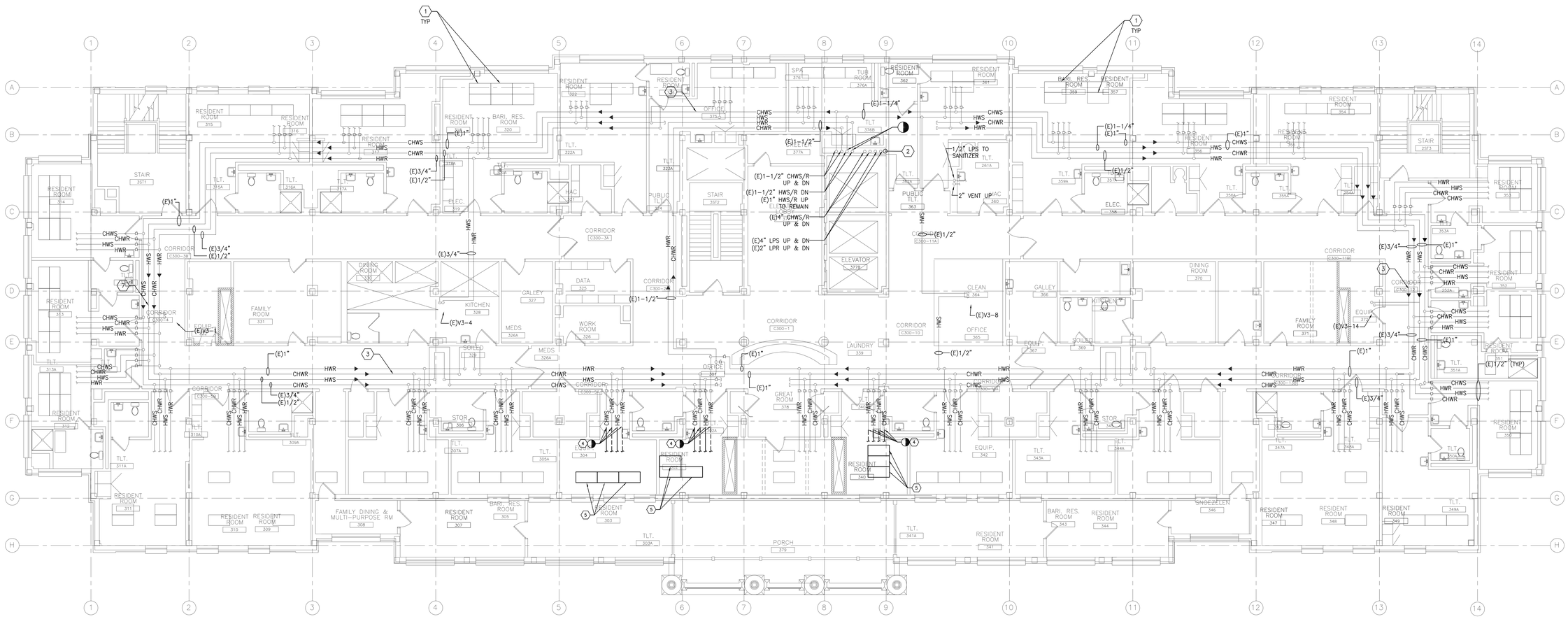
ACTUAL NORTH

GENERAL SHEET NOTES:

1. CONTRACTOR TO COORDINATE WITH ARCHITECTURAL PHASING PLANS.
2. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, AS-BUILT CONDITIONS, CLEARANCES, ETC. IN THE FIELD.
3. EXTEND CONTROLS AS NECESSARY TO THE RELOCATED EQUIPMENT.

SHEET KEYNOTES:

1. EXISTING RADIANT CEILING PANELS.
2. EXISTING PIPE CHASE.
3. EXISTING HOT AND CHILLED WATER PIPING ABOVE CEILING.
4. DISCONNECT CHWS/R AND HWS/R FROM POINTS INDICATED. RE-PIPE FROM POINTS INDICATED. PIPE SIZES, MATERIALS, AND INSULATION SHALL MATCH EXISTING.
5. RELOCATE (E)RADIANT PANELS TO NEW LOCATIONS AS SHOWN.



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PHONE: (856)429-4000
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Drawing Title	MECHANICAL THIRD FLOOR PIPING WORK PLAN
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	PNL
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	MP103
Dwg. 79 of 140	

Office of Construction and Facilities Management

Department of Veterans Affairs

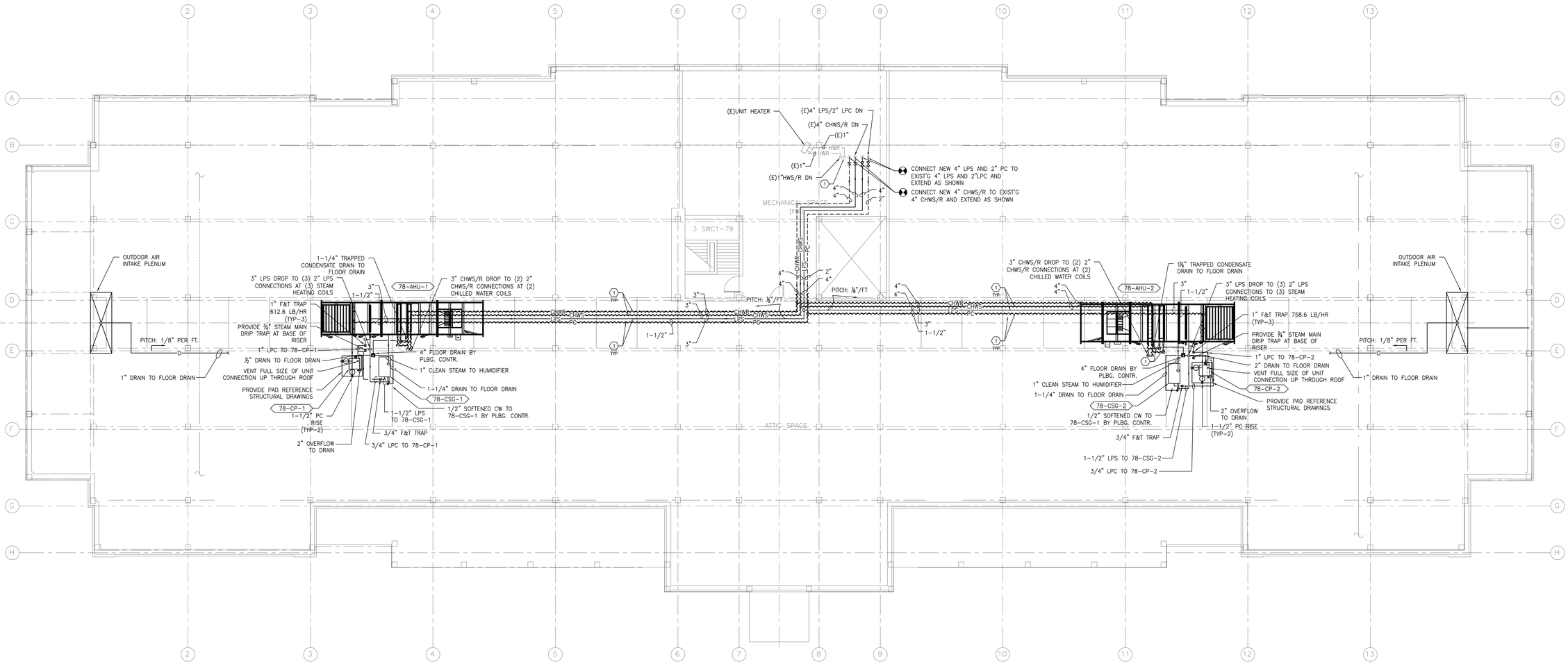
VA FORM 08-6231

GENERAL SHEET NOTES:

1. DO NOT SCALE THIS DRAWING. VERIFY ALL DIMENSIONS, CLEARANCES, AS-BUILT CONDITIONS, ETC. IN THE FIELD.
2. PROVIDE U.L. LISTED FIRE STOP ASSEMBLY AT ALL PIPE PENETRATIONS OF FLOORS, SHAFT WALLS, AND FIRE/SMOKE RATED ASSEMBLIES.
3. CONTRACTOR TO COORDINATE NEW EQUIPMENT AND EXISTING BRACING. THE CONTRACTOR IS RESPONSIBLE FOR THE RELOCATION OF BRACING IF NECESSARY TO ACCOMMODATE NEW MECHANICAL CONFIGURATION. REFERENCE THE STRUCTURAL DRAWINGS FOR DETAILS.
4. FURNISH AND INSTALL ALL MATERIALS AND EQUIPMENT NECESSARY FOR A COMPLETE INSTALLATION.
5. PITCH STEAM MAINS DOWNWARD ⅛" PER FOOT OF PIPE IN DIRECTION OF STEAM FLOW.

SHEET KEYNOTES:

1. PROVIDE HEAT TRACE ON PIPES SUBJECT TO FREEZING IN THE ATTIC SPACE, CHWS & R, CONDENSATE AND DRAIN.



1 MECHANICAL– ATTIC PLAN
SCALE: 1/8"=1'-0"

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

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SDVOSB CVE

Drawing Title: MECHANICAL ATTIC PIPING PLAN

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: PNL

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

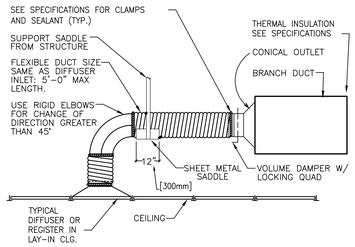
Drawing Number: MP104

Dwg. 80 of 140

Office of Construction and Facilities Management

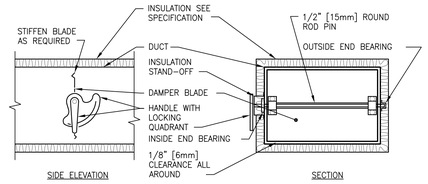
Department of Veterans Affairs

VA FORM 08-6231



NOTE:
THE USE OF FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

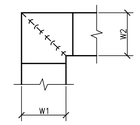
1 FLEXIBLE AIR DUCT CONNECTOR
NTS



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.

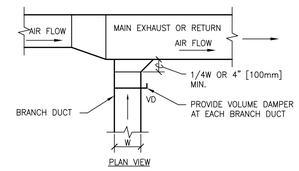
2 VOLUME DAMPER DETAIL
NTS



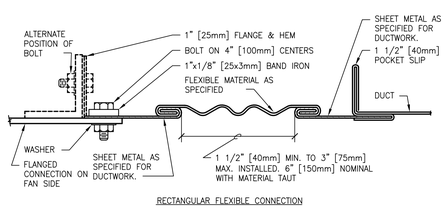
NOTE:

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" [50mm] RADIUS, 1 1/2" [40mm] MAXIMUM SPACE BETWEEN VANES AND A 3/4" [20mm] TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" [500mm] VANES SHALL BE DOUBLE VANE TYPE.

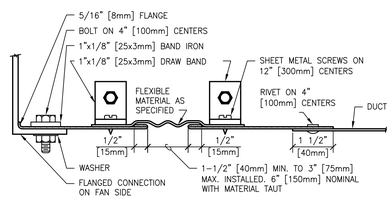
3 DUCTWORK SQUARE VANE ELBOWS
NTS



4 EXHAUST OR RETURN BRANCH DUCTWORK
NTS

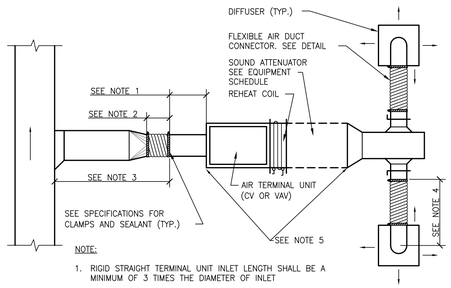


RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

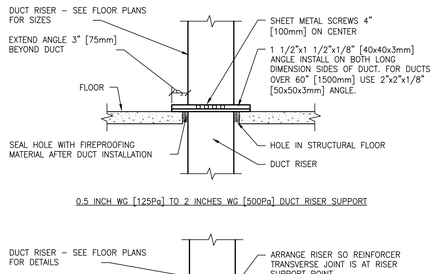
5 FLEXIBLE DUCT CONNECTIONS
NTS



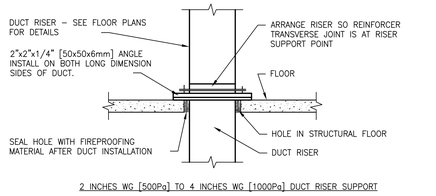
NOTE:

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.
6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

6 DUCT CONNECTIONS - AIR TERMINAL UNITS
NTS



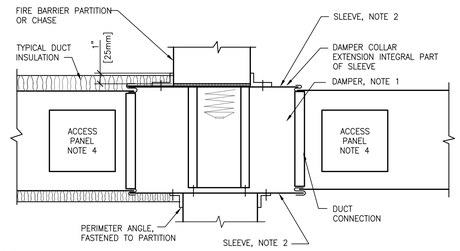
0.5 INCH WG [125Pa] TO 2 INCHES WG [500Pa] DUCT RISER SUPPORT



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.

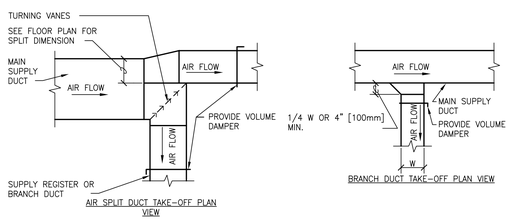
7 DUCT RISER SUPPORTS
NTS



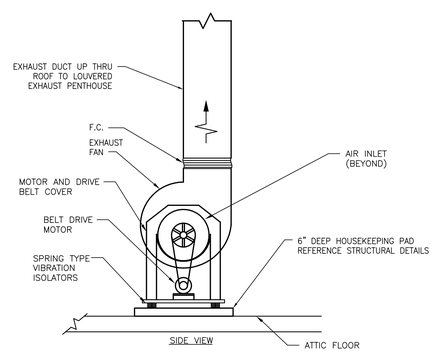
NOTE:

1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, IS SIMILAR. INSTALL IN STRICT ACCORDANCE WITH 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 ANGELS: 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. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS.

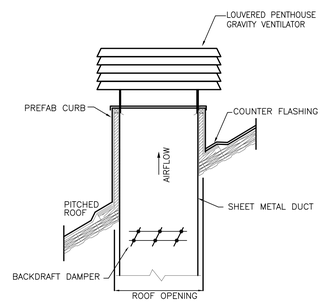
8 SECTION THRU FIRE DAMPER INSTALLATION
NTS



9 SUPPLY DUCTWORK TAKE-OFFS
NTS

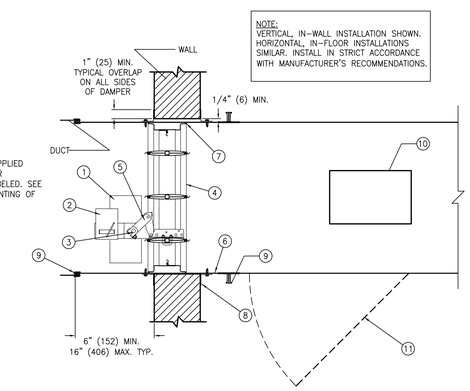


10 UTILITY SET EXHAUST FAN DETAIL
NTS



11 SLOPED ROOF CURB DETAIL
NTS

ITEM.	DESCRIPTION
1.	ACTUATOR (LOCATION MAY VARY). DAMPER MAY BE SUPPLIED WITHOUT ACTUATOR INSTALLED. UL LISTED FIRE DAMPER ACTUATORS MAY BE FIELD INSTALLED IF PROPERLY LABELED. SEE ACTUATOR INSTALLATION INSTRUCTIONS FOR FIELD MOUNTING OF DAMPER ACTUATORS.
2.	OPTIONAL FIRESTAT OR SP100
3.	AUXILLARY OPERATING JACK SHAFT
4.	DAMPER
5.	OVER CENTER LOCK
6.	SLEEVE
7.	CAULKING MATERIAL (MAY BE ON EITHER SIDE OF DAMPER FRAME).
8.	PFMA OR CONVENTIONAL MOUNTING ANGLES
9.	S-JOINT/DUCT MATE, SLEEVE TO DUCT
10.	SMOKE DETECTOR
11.	ACCESS DOOR (BOTH SIDES OF DAMPER)



12 COMBINATION FIRE/SMOKE DAMPER DETAIL
NTS

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NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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KOFFEL ASSOCIATES Fire Protection ENGINEERS
8815 CENTRE PARK DRIVE, SUITE 200 COLUMBIA, MD 21045
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KA PROJECT NUMBER: M023-03

pvl design associates
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www.pvldesignassociates.com

ARCHITECT/ENGINEERS:

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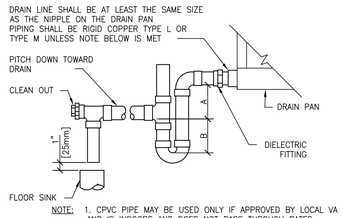
CHERRY HILL, NEW JERSEY 08034
PHONE: (856)429-4000
FAX: (856)429-5002
SDVOSB CVE

Drawing Title	MECHANICAL DETAILS - AIR SYSTEMS
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	PL
Drawn	VRR
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	M501
Dwg. 81 of 140	

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231



NOTE: 1. CPVC PIPE MAY BE USED ONLY IF APPROVED BY LOCAL VA AND IS INDOORS AND DOES NOT PASS THROUGH RATED BARRIERS.

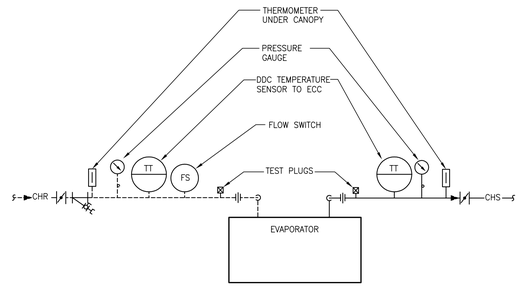
2. DIELECTRIC FITTING TO BE USED WHEN TWO DISSIMILAR METALS ARE TO BE CONNECTED.

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

WHERE X = STATIC PRESSURE IN PAN

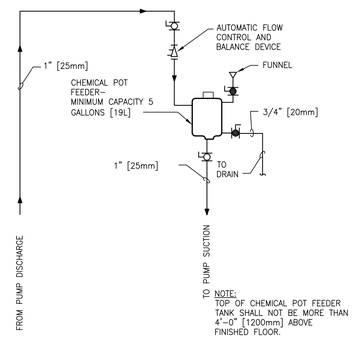
1 AIR HANDLING UNIT DRAIN TRAP DETAIL

NTS



2 AIR COOLED CHILLER - PIPING CONNECTIONS

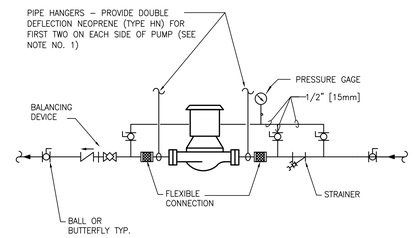
NTS



NOTE: TOP OF CHEMICAL POT FEEDER TANK SHALL NOT BE MORE THAN 4'-0" [1200mm] ABOVE FINISHED FLOOR.

3 WATER TREATMENT - CLOSED SYSTEMS

NTS

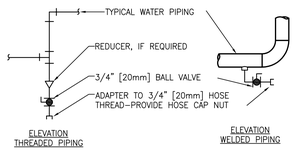


NOTES:

1. SUPPORT PUMP FROM PIPING ONLY. DO NOT SUPPORT PUMP FROM MOTOR.

4 IN-LINE PUMPS - CONNECTIONS

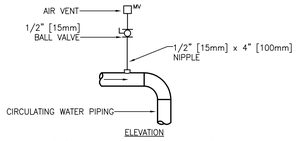
NTS



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.

2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

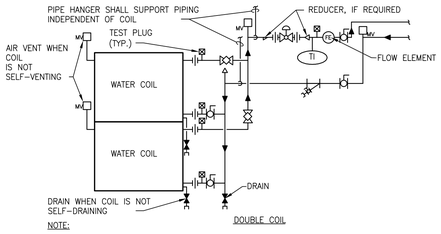


TYPICAL MANUAL AIR VENT

NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.

5 DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)

NTS



NOTE:

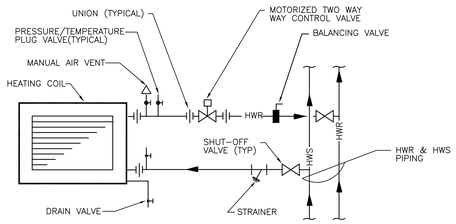
1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" [100mm]Ø PIPE & SMALLER. TYPE "H-P" FOR 5" [125mm]Ø PIPE & LARGER.

2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALES, OR EQUIPMENT.

3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

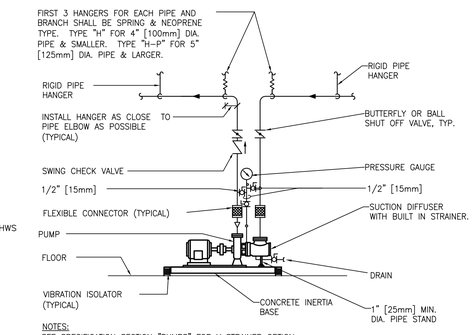
6 CHILLED WATER COILS - PIPING CONNECTIONS

NTS



7 HOT WATER COILS - PIPING CONNECTIONS

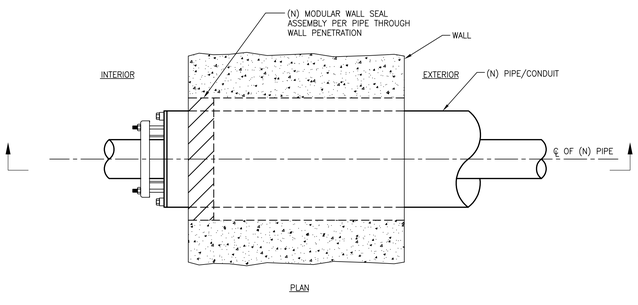
NTS



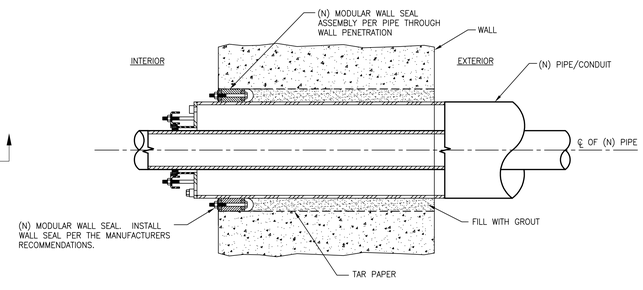
NOTES:
SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION

8 SINGLE SUCTION FLOOR-MOUNTED PUMPS - CONNECTIONS WITH FLEXIBLE CONNECTORS

NTS



PLAN



SECTION

9 PIPE THROUGH WALL SEAL DETAIL

NTS

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NO.	DESCRIPTION	DATE

CONSULTANTS:

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40 Wilderlair Road, Rochester NY 14623
585-321-1210 www.gardnerplus.com

KOFFEL ASSOCIATES Fire Protection ENGINEERS
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410-730-2246 (BALT) 410-730-2588 (FAX)
KA PROJECT NUMBER: M023-03

pvl design associates
3031 Valley Ave., Suite 106
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ARCHITECT/ENGINEERS:

Miller-Remick LLC
M.E.P. & Structural Engineering
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CHERRY HILL, NEW JERSEY 08034
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FAX: (856)429-5002

SDVOSB CVE

Drawing Title: MECHANICAL DETAILS - HYDRONIC SYSTEMS	Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER	Project Number: 528-A6-13-602	Office of Construction and Facilities Management
Approved: Project Director	Location: VAMC, BATH, NEW YORK	Building Number: BLDG. #78	
	Date: 08-06-2015 / Checked: PL / Drawn: VRR	Drawing Number: M502	Department of Veterans Affairs
		Dwg. 82 of 140	

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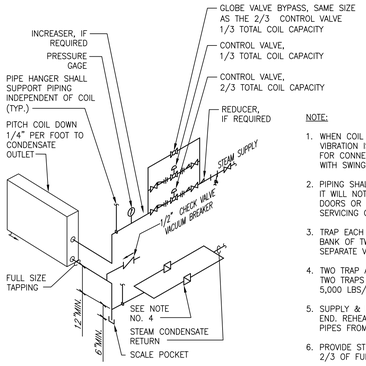
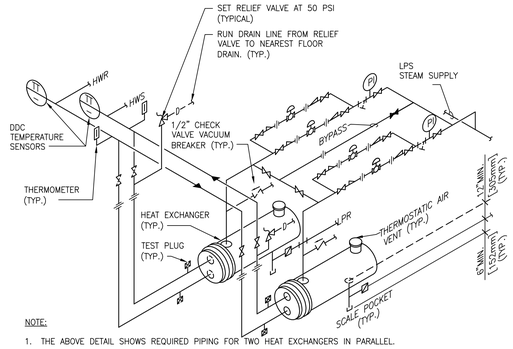


NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATOR UNITS, THE RUNOUT PIPING FOR CONNECTIONS TO COIL SHALL BE INSTALLED WITH SWING JOINTS TO ALLOW FOR THE VIBRATION.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.
3. TRAP EACH COIL SEPARATELY WHEN INSTALLED IN A BANK OF TWO OR MORE HIGH. ALSO PROVIDE SEPARATE VACUUM BREAKER FOR EACH COIL.
4. TWO TRAP ASSEMBLIES IN PARALLEL ARE SHOWN. TWO TRAPS REQUIRED WHEN CONDENSATE LOAD IS 5,000 LBS/HR [2400 KG/HR] OR GREATER.
5. SUPPLY & RETURN PIPES ARE SHOWN FROM SAME END. REHEAT COIL MAY HAVE SUPPLY & RETURN PIPES FROM OPPOSITE ENDS.
6. PROVIDE STEAM CONTROL VALVES FOR 1/3 AND 2/3 OF FULL FLOW.

1 STEAM COIL - PIPING CONNECTIONS

NTS

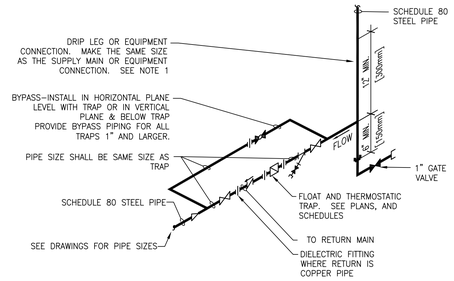


NOTE:

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 SIZE AS THE CONNECTIONS TO THE CONTROL VALVES.

2 HEAT EXCHANGER - STEAM TO HOT WATER

NTS

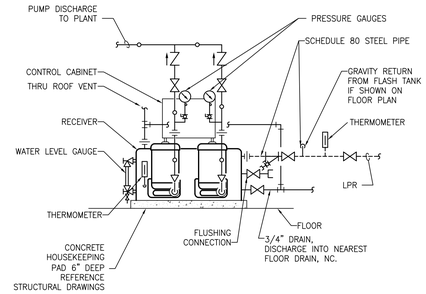


NOTE:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

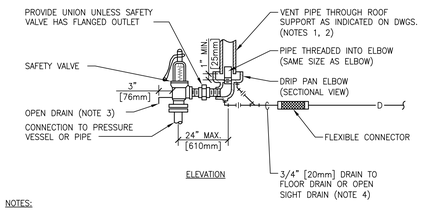
3 FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY

NTS



4 CONDENSATE PUMPS - PIPING CONNECTIONS

NTS

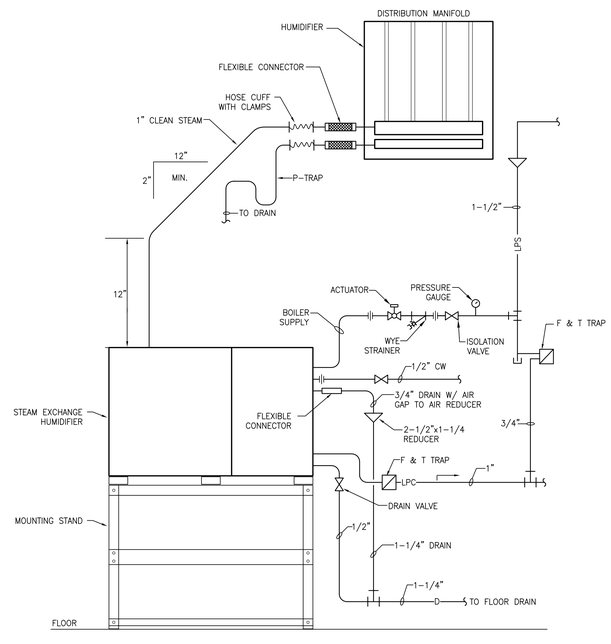


NOTES:

1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1. POWER PIPING CODE, APPENDIX II.
2. VENT PIPE SHALL TERMINATE 6' [1829mm] MIN. ABOVE FINISHED ROOF.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

5 STEAM SAFETY VALVE

NTS



6 STEAM GENERATOR/HUMIDIFIER PIPING DIAGRAM

NTS

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NO.	DESCRIPTION	DATE

CONSULTANTS:

GARDNER PLUS ARCHITECTS, PLLC
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FAX: (856)429-5002

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Drawing Title: MECHANICAL DETAILS - STEAM SYSTEMS	Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER	Project Number: 528-A6-13-602	Office of Construction and Facilities Management
Approved: Project Director	Location: VAMC, BATH, NEW YORK	Building Number: BLDG. #78	
	Date: 08-06-2015 / Checked: PL / Drawn: VRR	Drawing Number: M503	Department of Veterans Affairs
		Dwg. 83 of 140	

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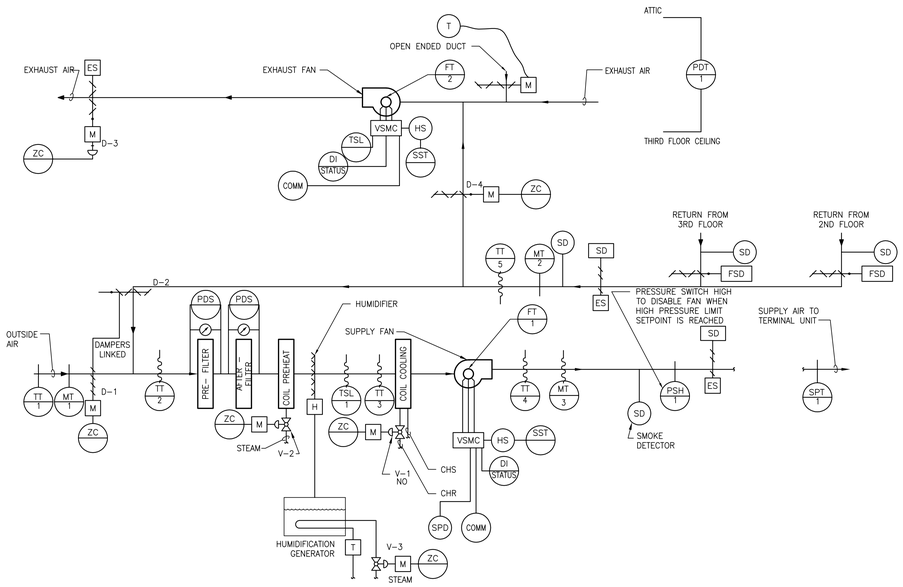

1 VARIABLE AIR VOLUME AIR HANDLING UNIT (78–AHU–1 & 2) CONTROL DIAGRAM

NTS

POINTS SUMMARY - 78-AHU-1 & 2

SYSTEM COMPONENT	Point ID	SYSTEM OUTPUT Binary Electric	SYSTEM OUTPUT Binary Pneumatic	SYSTEM OUTPUT Analog Electric	SYSTEM OUTPUT Analog Pneumatic	SYSTEM SENSOR INPUTS Binary Status		SYSTEM SENSOR INPUTS Analog Temperature	Pressure	Humidity	Flow	Current	DIGITAL COMMUNICATIOS VFD Speed (hz)	VFD Amps	VFD Fault		SYSTEM SOFTWARE/CONTROL Alarm Processing Equipment Status	Low Limit	High Limit	Application/Function Lead/lag	Start/Stop	Value	Supply Fan Start Interlock	System Graphic
OUTSIDE AIR TEMPERATURE	TT-1							•																•
OUTSIDE AIR HUMIDITY	MT-1									•														•
MIXED AIR TEMPERATURE	TT-2							•																•
PREHEAT COIL LEAVING TEMPERATURE	TT-3							•																•
SUPPLY AIR TEMPERATURE	TT-4							•																•
RETURN AIR TEMPERATURE	TT-5							•																•
RETURN AIR HUMIDITY	MT-2									•														•
SUPPLY AIR HUMIDITY	MT-3									•														•
SUPPLY AIR SMOKE DAMPER POSITION	SD	•																						
SUPPLY AIR SMOKE DAMPER END SWITCH	SD ES					•																		•
EXHAUST AIR CONTROL DAMPER POSITION	D-3 ZC	•																						
EXHAUST AIR CONTROL DAMPER END SWITCH	D-3 ES					•																		•
OUTSIDE/RETURN AIR DAMPER	D-1 AND D-2 ZC			•																		•		•
RELIEF DAMPER	D-4 ZC			•																		•		•
PRE FILTER DIFFERENTIAL PRESSURE	DPS					•													•					•
AFTER FILTER DIFFERENTIAL PRESSURE	DPS					•													•					•
PREHEAT STEAM CONTROL VALVE	V-2 ZC			•																		•		•
CHILLED WATER CONTROL VALVE	V-1 ZC			•																		•		•
HUMIDIFICATION STEAM CONTROL VALVE	V-3 ZC			•																		•		•
COOLING COIL FREEZESTAT	TSL-1					•												•						•
SUPPLY FAN START/STOP	SF SST	•																			•			•
SUPPLY FAN SPEED	SF SPD			•																		•		
SUPPLY FAN SPEED	COMM												•											•
SUPPLY FAN STATUS	SF DI					•											•							•
SUPPLY AIRFLOW (CFM)	FT-1										•													•
SUPPLY FAN FAULT	COMM														•		•							•
SUPPLY FAN AMPS	COMM													•										•
SUPPLY AIR PRESSURE	SPT-1								•															•
STATIC PRESSURE HIGH LIMIT	PSH-1					•													•				•	•
EXHAUST FAN START/STOP	EF SST	•																			•			•
EXHAUST FAN SPEED	EF SPD			•																		•		
EXHAUST FAN SPEED	COMM												•											•
EXHAUST FAN STATUS	EF DI					•											•							•
EXHAUST AIRFLOW (CFM)	FT-2										•													•
EXHAUST FAN FAULT	COMM														•									•
EXHAUST FAN AMPS	COMM													•										•
SPACE PRESSURE DIFFERENTIAL SENSOR	PDT-1								•															•
SUPPLY AIR SMOKE DETECTOR	SD																						•	
SECOND FLOOR SMOKE DETECTOR	SD																						•	
THIRD FLOOR SMOKE DETECTOR	SD																						•	

CONTROLS SYMBOLS

- T — ROOM THERMOSTAT/TRANSMITTER – WALL MOUNT
- M — ROOM HUMIDISTAT (MOISTURE)/TRANSMITTER – WALL MOUNT
- TT — TEMPERATURE TRANSMITTER
- TT — TEMPERATURE TRANSMITTER, AVERAGING ELEMENT
- MT — MOISTURE (HUMIDITY) TRANSMITTER
- PT — PRESSURE TRANSMITTER
- SPT — STATIC PRESSURE SENSOR
- FT — FLOW TRANSMITTER
- IT — CURRENT TRANSMITTER
- CT — CONDUCTIVITY TRANSMITTER
- SD — SMOKE DETECTOR
- PDT — PRESSURE DIFFERENTIAL TRANSMITTER
- PDS — PRESSURE DIFFERENTIAL SWITCH
- HS — HAND SWITCH (HAND–OFF–AUTO SWITCH)
- ZC — VALVE OR DAMPER POSITION CONTROLLER
- KR — LOCAL RECORDING TIME CLOCK (RUNTIME)
- TSL — TEMPERATURE SWITCH, LOW (FREEZESTAT)
- TSH — TEMPERATURE SWITCH, HIGH
- LC — LEVEL CONTROLLER
- LT — LEVEL TRANSMITTER
- T — TRAP
- H — HUMIDIFIER

CONTROLS SYMBOLS (CONT'D)

- PSH — PRESSURE SWITCH HIGH
- PSL — PRESSURE SWITCH LOW
- EPT — ELECTRONIC TO PNEUMATIC TRANSDUCER
- AT CO2 — CARBON DIOXIDE TRANSMITTER
- AT CO — CARBON MONOXIDE TRANSMITTER
- AT OC — OCCUPANCY SENSOR
- LTCP — LOCAL TEMPERATURE CONTROL PANEL
- HVAC — HVAC CONTROL PANEL
- VSMC — VARIABLE SPEED MOTOR CONTROLLER
- TC — TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
- PC — PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
- SPD — SPEED SIGNAL. SEE SEQUENCE OF OPERATION
- SST — START/STOP
- FC — FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
- FSH — FLOW SWITCH HIGH
- FSL — FLOW SWITCH LOW
- KC — TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
- COMM — BACNET DIGITAL COMMUNICATIONS
- SD — SMOKE DAMPER
- FSD — COMBINATION FIRE/SMOKE DAMPERS
- ES — END SWITCH
- M — DAMPER MOTOR, VALVE ACTUATOR

AIR UNITS 78–AHU–1 AND 2 SEQUENCE OF OPERATION

A. GENERAL DESCRIPTION:

1. AIR UNITS ARE VAV AIR UNITS EACH FEEDING HALF OF THE FLOOR FOR THE SECOND AND THIRD FLOORS OF THE FACILITY. EACH AIR HANDLING SYSTEM CONSISTS OF MODULATING OUTSIDE AIR INTAKE DAMPERS LINKED TO RETURN DAMPERS WITH PRE AND INTERMEDIATE FILTERS, STEAM PREHEAT COIL, HUMIDIFIER, CHILLED WATER COOLING COIL, VARIABLE SPEED SUPPLY FAN FINAL FILTER AND DISCHARGE SMOKE DAMPER.
2. EACH AIR HANDLING SYSTEM HAS AN ASSOCIATED VARIABLE VOLUME EXHAUST FAN THAT FUNCTIONS AS GENERAL EXHAUST AS WELL AS AIR UNIT ECONOMIZER RELIEF EXHAUST.

B. CONTROL OUTPUT DEVICES:

1. OUTSIDE/RETURN DAMPERS – DAMPERS, OPERATORS AND LINKAGE IS PROVIDED WITH THE AIR UNIT. OPERATOR IS TO BE ELECTRIC, NORMALLY CLOSED (TO OUTSIDE AIR), SPRING RETURN, MODULATING.
2. PREHEAT STEAM COIL VALVE – ELECTRIC, NORMALLY CLOSED, SIZED FOR 7 PSI DROP AT DESIGN FLOW.
3. HUMIDIFICATION GENERATOR STEAM CONTROL VALVE – ELECTRIC, NORMALLY CLOSED, SIZED FOR 7 PSI DROP AT DESIGN FLOW.
4. COOLING COIL CHILLED WATER CONTROL VALVE – ELECTRIC, V–PORT BALL VALVE, NORMALLY CLOSED, TWO–WAY, SIZED FOR 3 PSI PRESSURE DROP AT DESIGN FLOW.
5. SUPPLY AIR SMOKE DAMPER – DAMPERS, OPERATOR AND END SWITCHES PROVIDED WITH AIR UNIT. ELECTRIC, TWO POSITION, NORMALLY CLOSED.
6. EXHAUST FAN – VFD WITH BACNET COMMUNICATIONS INTERFACE.
7. SUPPLY FAN – VFD WITH BACNET COMMUNICATIONS INTERFACE.
8. EXHAUST DAMPERS – PARALLEL BLADE, ELECTRIC, TWO–POSITION, NORMALLY CLOSED, WITH END SWITCHES.

C. AIR UNIT SEQUENCE:

1. START UP
   a. UNIT TO HAVE AN OCCUPIED–UNOCCUPIED SCHEDULE BASED ON TIME OF DAY AND DAY OF WEEK.
   b. IN OCCUPIED MODE THE UNIT IS TO RUN 100 PER CENT OF THE TIME.
   c. IN UNOCCUPIED MODE THE UNIT IS TO BE CYCLED ON ONLY TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE HEATING SETPOINT.
   d. UPON THE CONTROL SYSTEM REQUIRING THE UNIT TO BE STARTED, THE SUPPLY AIR SMOKE AND THE EXHAUST AIR CONTROL DAMPERS SHALL BE COMMANDED TO OPEN.
   e. UPON THE END SWITCHES OF THESE DAMPERS PROVING THAT THE DAMPERS ARE BOTH OPEN, AN ENABLE SIGNAL SHALL BE GIVEN TO THE SUPPLY FAN AND EXHAUST FAN VFDS.
   f. THE UNIT SAFETIES OF FREEZE STAT (TSL–1), HIGH PRESSURE SWITCH PSH–1) AND SUPPLY AIR, SECOND FLOOR AND THIRD FLOOR SMOKE DETECTORS SHALL BE MONITORED AND HARD WIRED THROUGH THE VFD RUN CONTACTS. THE AIR UNIT START UP SHALL INITIATE, IN BOTH THE AUTOMATIC AND THE HAND POSITION OF VFD SELECTOR, ONLY IF THE SAFETIES ARE SATISFIED.
   g. THE SUPPLY AND EXHAUST FANS SHALL HAVE A CONTROLLED RAMP UP TO SPEED OVER A PERIOD OF THIRTY SECONDS. SPEED IS TO BE AS DESCRIBED BELOW IN THE RUN SEQUENCE.
   h. THE RUN SEQUENCE CONTROL FUNCTIONS SHALL BE INITIATED UPON START OF THE FAN.
2. RUN SEQUENCE (OCCUPIED):
   a. THE OUTSIDE TEMPERATURE (TT–1) AND THE OUTDOOR HUMIDITY (MT–1) VALUES ARE TO BE USED TO CALCULATE THE OUTSIDE AIR ENTHALPY. THE RETURN TEMPERATURE (TT–5) AND THE RETURN HUMIDITY (MT–2) VALUES ARE TO BE USED TO CALCULATE THE RETURN AIR ENTHALPY.
   b. WHEN THE OUTDOOR AIR ENTHALPY IS LOWER THAN THE RETURN AIR ENTHALPY, BOTH AIR UNITS (78–AHU–1 AND 2) ARE TO BE INDEXED TO BE IN ECONOMIZER MODE SIMULTANEOUSLY.
   c. WHEN THE UNIT IS NOT IN ECONOMIZER MODE, THE COMBINATION OUTSIDE/RETURN DAMPERS (D–1 AND D–2) ARE TO BE COMMANDED TO THE MINIMUM OUTSIDE AIR POSITION AS ESTABLISHED BY THE UNIT SCHEDULE. THIS POSITION IS TO BE ESTABLISHED BY THE BALANCE CONTRACTOR.
   d. WHEN THE UNIT IS INDEXED TO BE IN ECONOMIZER MODE, THE COMBINATION RETURN/OUTSIDE AIR DAMPERS ARE TO BE MODULATED TO MAINTAIN THE MIXED AIR TEMPERATURE OF 52 DEGREES AS SENSED BY TT–2.
   e. ON A FALL IN SUPPLY AIR TEMPERATURE BELOW THE SETPOINT AS MEASURED BY TT–3, THE STEAM HEATING COIL CONTROL VALVE (V–2) IS TO BE MODULATED OPEN WITH PID CONTROL TO MAINTAIN THE SUPPLY AIR TEMPERATURE. ON A RISE IN SUPPLY AIR TEMPERATURE ABOVE THE SETPOINT, THE REVERSE SHALL OCCUR.
   f. ON A RISE IN SUPPLY AIR TEMPERATURE ABOVE THE SETPOINT AS MEASURED BY TT–3, THE CHILLED WATER COOLING COIL CONTROL VALVE (V–1) IS TO BE MODULATED OPEN WITH PID CONTROL TO MAINTAIN THE SUPPLY AIR TEMPERATURE. ON A FALL IN SUPPLY AIR TEMPERATURE BELOW THE SETPOINT, THE REVERSE SHALL OCCUR.
   g. THE SUPPLY FAN SPEED IS TO BE MODULATED TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SENSOR SETPOINT.
   h. THE STEAM VALVE TO THE HUMIDIFICATION GENERATOR SHALL BE MODULATED TO MEET THE SUPPLY AIR HUMIDITY SETPOINT. THE SUPPLY AIR HUMIDITY IS MEASURED BY MT–1
   i. THE HUMIDIFIER OPERATION SHALL BE DISABLED ANY TIME THE COOLING COIL CONTROL VALVE IS OPENED.
   j. THE SUPPLY AIR HUMIDITY SETPOINT IS TO BE ESTABLISHED AS FOLLOWS:
      1) THE RETURN AIR HUMIDITY AS MEASURED BY MT–2 SHALL RESET THE SUPPLY AIR HUMIDITY SETPOINT.
      2) WHEN THE RETURN HUMIDITY IS 30 PERCENT, THE SUPPLY AIR HUMIDITY SETPOINT SHALL BE 50 PERCENT RH.
      3) THE SUPPLY AIR SETPOINT IS TO LINEARLY INCREASE TO 80 PERCENT RH AS THE RETURN AIR HUMIDITY DECREASES TO 25 PERCENT RH.
   k. THE HUMIDIFICATION CONTROL LOOP SHALL BE SLOW ACTING TO ALLOW FOR THE SLOW REACTION OF THE HUMIDIFICATION GENERATOR TO A CHANGE CAPACITY IN RESPONSE TO A CHANGE IN CONTROL SIGNAL.
   l. EXHAUST FAN (78–EF–1 AND 78–EF–2)FAN OPERATION IS TO BE BASED ON THE AIR UNIT ECONOMIZER INDEXING AT THAT TIME AS FOLLOWS:
      1) DURING NON–ECONOMIZER MODE, DAMPER D–4 SHALL BE CLOSED AND THE EXHAUST FAN SPEED SHALL BE MODULATED TO MAINTAIN THE EXHAUST SETPOINT AS MEASURED BY FT–2.
      2) WHEN THE UNITS GOES INTO ECONOMIZER MODE, THE DAMPER D–4 SHALL BE OPENED AND BOTH EXHAUST FANS SHALL BE MODULATED TO MAINTAIN A THIRD FLOOR TO OUTDOOR DIFFERENTIAL PRESSURE SETPOINT OF POSITIVE 0.02 INCHES. BOTH EXHAUST FANS ARE TO RECEIVE THE SAME OPERATING SPEED VALUE. THE EXHAUST FAN FLOW SHALL BE LIMITED TO EXHAUST, AS A MINIMUM, THE NON–ECONOMIZER FLOW.
3. RUN SEQUENCE (UNOCCUPIED)
   a. THE UNIT IS TO BE CYCLED ON TO MAINTAIN THE UNOCCUPIED HEATING SPACE SETPOINT OF THE VAV TERMINALS AND IS TO FOLLOW THE STARTUP SEQUENCE ABOVE.
   b. THE UNIT SHALL RUN WHEN ANY OF THE VAV TEMPERATURE SENSORS FALLS BELOW SETPOINT MINUS 3 DEGREES. THE UNIT SHALL BE CYCLED OFF WHEN THE TEMPERATURE IN THE COLDEST ZONE ATTAINS UNOCCUPIED SETPOINT.
   c. AIR UNIT IS TO START, RUN AND SHUT DOWN WITH THE NORMAL OCCUPIED SEQUENCE EXCEPT THE OUTSIDE AIR DAMPERS, THE HUMIDIFIER CONTROL VALVE AND THE COOLING COIL CONTROL VALVE ARE TO BE CLOSED AND THE EXHAUST FAN IS NOT ENABLED TO RUN DURING THIS OPERATION.
4. SHUT DOWN SEQUENCE:
   a. HUMIDIFIER VALVE SHALL CLOSE.
   b. SUPPLY FAN SHALL STOP. IF THE HUMIDIFIER HAS BEEN OPERATING, THERE SHALL BE A 10 SECOND DELAY FROM THE TIME THE HUMIDIFIER IS SHUT DOWN TO THE TIME THE FAN IS SHUT DOWN.
   c. EXHAUST FAN SHALL STOP AT THE SAME TIME AS THE SUPPLY FAN.
   d. CHILLED WATER CONTROL VALVE SHALL CLOSE.
   e. STEAM HEATING COIL CONTROL VALVE SHALL BE MODULATED TO MAINTAIN THE STATIC AIR UNIT TO 50 DEGREES AS MEASURED BY THE TEMPERATURE SENSOR DOWNSTREAM OF THE HEATING COIL.
   f. AFTER A 10 SECOND DELAY OF COMMANDING THE SUPPLY AND EXHAUST FANS TO STOP, THE OUTSIDE AIR, EXHAUST AIR AND SUPPLY SMOKE DAMPERS SHALL CLOSE.
5. SAFETY AND FAILURE SHUT DOWN:
   1) THE AIR UNIT WILL SHUT DOWN AND AN AUDIBLE AND VISUAL ALARM SHALL OCCUR THROUGH THE BAS BASED ON ANY SAFETY NOT BEING SATISFIED OR DETECTION OF EQUIPMENT FAILURE.
   2) SAFETIES INCLUDE THE SUPPLY AND RETURN AIR SMOKE DETECTORS, HIGH PRESSURE SWITCH AND THE UNIT FREEZE STAT.
   3) THE UNIT SHALL SHUT DOWN UPON DETECTION OF LOW AMPERAGE DRAW OF THE SUPPLY AND EXHAUST FANS AS DETERMINED THROUGH THE VFD BACNET COMMUNICATION INTERFACE. AFTER 15 SECONDS, TO ALLOW THE FANS TO ATTAIN MINIMAL OPERATING SPEED, IF THE FANS DO NOT DRAW MORE THAN 15 PERCENT OF THE FULL DESIGN AMPERAGE, A FAN FAILURE SHALL BE ASSUMED.
   4) A VFD FAILURE AS REPORTED THROUGH THE BACNET COMMUNICATION SHALL BE TREATED AS A SAFETY NOT BEING SATISFIED.
   5) SHUT DOWN PROCEDURE SHALL BE THE SAME AS THE GENERAL SHUT DOWN DESCRIBED ABOVE.
6. SETPOINTS:
   a. SETPOINTS ARE TO BE SOFTWARE ADJUSTABLE. THE FOLLOWING SETPOINTS ARE INITIAL VALUES OR ARE VALUES TO BE SET BY THE BALANCE CONTRACTOR.
   b. MIXED AIR TEMPERATURE (ECONOMIZER MODE) – 52°F
   c. SUPPLY AIR TEMPERATURE (NORMAL MODE):
      1. OUTDOOR AIR DEWPOINT TEMPERATURE LESS THAN 55°F: 60°F
      2. OUTDOOR AIR DEWPOINT TEMPERATURE GREATER THAN 55°F: 55°F
   d. SUPPLY AIR DUCT PRESSURE – 0.75 INCHES INITIAL. FINAL VALUE TO BE ESTABLISHED BY THE BALANCE CONTRACTOR.
   e. EXHAUST FAN 78–EF–1 AIRFLOW (DURING NON–ECONOMIZER CYCLE OPERATION) – 7270 CFM
   f. EXHAUST FAN 78–EF–2 AIRFLOW (DURING NON–ECONOMIZER CYCLE OPERATION) – 9150 CFM

ATTIC VENTILATION CONTROL SEQUENCE

A. ATTIC THERMOSTAT SET POINT SHALL BE SET AS FOLLOWS: 95°F
B. UPON RISE IN SPACE TEMPERATURE SENSED BY THE WALL MOUNTED THERMOSTAT ABOVE 95°F THE CONTROL DAMPERS SHALL FULLY OPEN ON THE EXHAUST MAIN AND 78–EF–1 AND 78–EF–2 SHALL INCREASE BY 2125 CFM EACH.
C. UPON DROP IN SPACE TEMPERATURE BELOW THE 95° F SETPOINT, THE CONTROL DAMPERS SHALL CLOSE AND THE EXHAUST FANS SHALL RAMP DOWN.

BID DOCUMENTS

FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

VA FORM 08-6231

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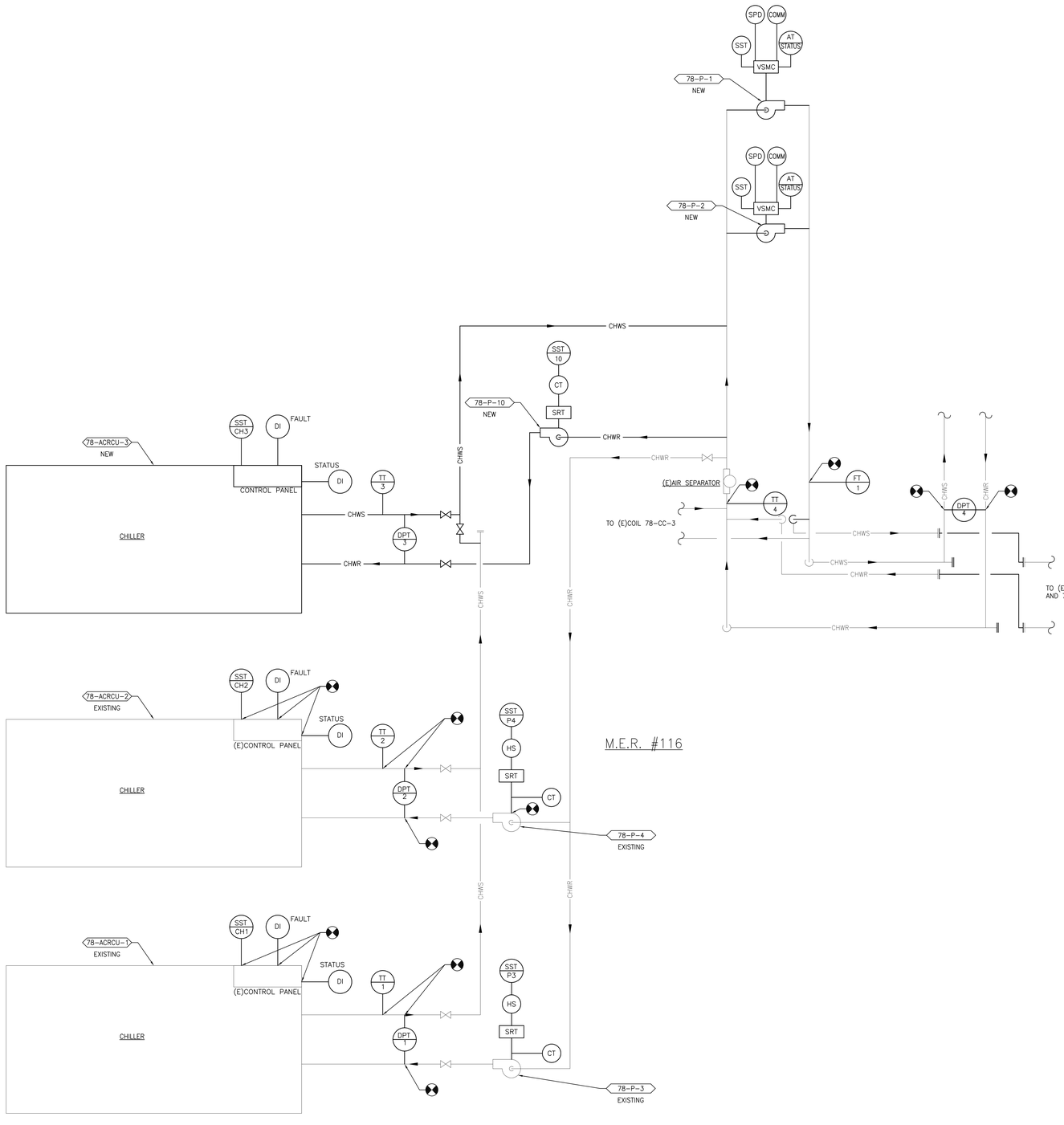
SDVOSB CVE

Drawing Title: MECHANICAL DETAILS - AUTOMATIC CONTROLS	Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER	Project Number: 528-A6-13-602	Office of Construction and Facilities Management
Approved: Project Director	Location: VAMC, BATH, NEW YORK	Building Number: BLDG. #78	
	Date: 08-06-2015 / Checked: PL / Drawn: VRR	Drawing Number: M504	Department of Veterans Affairs
		Dwg. 84 of 140	



REFER TO DWG. M504 FOR CONTROL SYMBOL LIST FOR NEW PIPING REFERENCE DRAWINGS

POINTS SUMMARY - CHILLER PLANT

SYSTEM COMPONENT	Point ID	SYSTEM OUTPUT Binary Electric	SYSTEM OUTPUT Binary Pneumatic	SYSTEM OUTPUT Analog Electric	SYSTEM OUTPUT Analog Pneumatic	SYSTEM SENSOR INPUTS Binary Status	SYSTEM SENSOR INPUTS Analog Temperature	Pressure	Humidity	Flow	Current	DIGITAL COMMUNICATIOS VFD Speed (hz)	VFD Amps	VFD Fault		SYSTEM SOFTWARE/CONTROL Alarm Processing Equipment Status	Low Limit	High Limit	Application/Function Lead/Lag	Start/Stop	Value	System Graphic
CHILLED WATER SUPPLY TEMPERATURE	TT-1						•										•	•				•
CHILLED WATER SUPPLY TEMPERATURE	TT-2						•										•	•				•
CHILLED WATER SUPPLY TEMPERATURE	TT-3						•										•	•				•
COMMON CHILLER WATER RETURN TEMP	TT-4						•											•				•
OUTSIDE AIR TEMPERATURE	TT-5						•															•
CHILLER START/STOP	SST-CH1	•																				
CHILLER START/STOP	SST-CH2	•																				
CHILLER START/STOP	SST-CH3	•																				
CHILLER RUN STATUS	DI-CH1					•										•						•
CHILLER RUN STATUS	DI-CH2					•										•						•
CHILLER RUN STATUS	DI-CH3					•										•						•
CHILLER FAULT	DI-CH1					•										•						•
CHILLER FAULT	DI-CH2					•										•						•
CHILLER FAULT	DI-CH3					•										•						•
CHILLER FLOW	DPT-1									•							•				•	•
CHILLER FLOW	DPT-2									•							•				•	•
CHILLER FLOW	DPT-3									•							•				•	•
PUMP P1 START/STOP	SST P1	•																	•			
PUMP P1 SPEED	SPD P1			•																	•	•
PUMP P1 VFD FAULT	COMM													•								•
PUMP P1 AMPS	COMM												•									•
PUMP P1 SPEED	COMM											•										•
PUMP P2 START/STOP	SST P2	•																	•			
PUMP P2 SPEED	SPD P2			•																	•	•
PUMP P2 VFD FAULT	COMM													•								•
PUMP P2 AMPS	COMM												•									•
PUMP P3 SPEED	COMM											•										•
PUMP P3 START/STOP	SST P3	•																		•		
PUMP P4 START/STOP	SST P4	•																		•		
PUMP P10 START/STOP	SST P10	•																		•		
PUMP P3 STATUS	CT					•										•						•
PUMP P4 START/STOP	CT					•										•						•
PUMP P10 START/STOP	CT					•										•						•

CHILLER PLANT SEQUENCE OF OPERATION

A. GENERAL DESCRIPTION:

1. CHILLER PLANT CONSISTS OF THREE AIR COOLED CHILLERS (78-ARCU-1, 78-ARCU-2 AND 78-ARCU-3) IN A PRIMARY SECONDARY PUMPING ARRANGEMENT.
2. TWO OF THE CHILLERS (78-ARCU-1 AND 78-ARCU-2) ARE EXISTING AND ONE (78-ARCU-3) IS NEW. THE ENTIRE CHILLER PLANT IS TO BE CONTROLLED UNDER THIS DDC CONTROL SCOPE OF WORK.
3. THE PRIMARY PUMPS CONSIST OF THREE DEDICATED CONSTANT SPEED PUMPS MATCHED WITH THE FLOW REQUIREMENTS OF THE CHILLER SERVED.
4. THE SECONDARY PUMPS CONSISTS OF TWO, 50 PERCENT CAPACITY (OF FULL SYSTEM CAPACITY) VARIABLE FLOW PUMPS.
5. MINIMUM FLOW OF THE SECONDARY CIRCUIT IS PROVIDED BY EXISTING THREE-WAY CHILLED WATER CONTROL VALVES AT EXISTING AIR HANDLING UNITS.

B. CHILLER PLANT SEQUENCE:

1. THE CHILLER PLANT SHALL BE ENABLED TO RUN WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 56 DEGREES.
2. OVERALL PLANT OPERATION:
   a. UPON THE CHILLER PLANT BEING ENABLED THE SECONDARY PUMPS SHALL RUN AS DESCRIBED BELOW.
   b. THE SECONDARY CHILLED WATER FLOW SHALL BE MEASURED BY FLOW TRANSMITTER FT-1.
   c. THE SEQUENCE OF CHILLER RUN OPERATION WITH AN INCREASING CAPACITY REQUIREMENT IS AS FOLLOWS:
      1) SECONDARY FLOW LESS THAN 30 GPM – NO CHILLERS OPERATING.
      2) SECONDARY FLOW GREATER THAN 30 GPM AND LESS THAN 125 GPM – CHILLER 78-ARCU-2 SHALL RUN.
      3) SECONDARY FLOW GREATER THAN 125 GPM AND LESS THAN 180 GPM – CHILLER 78-ARCU-3 SHALL RUN.
      4) SECONDARY FLOW GREATER THAN 180 GPM AND LESS THAN 310 GPM – CHILLERS 78-ARCU-3 AND 78-ARCU-1 SHALL RUN.
      5) SECONDARY FLOW GREATER THAN 310 GPM – CHILLERS 78-ARCU-1, 78-ARCU-2 AND 78- ARCU-3 SHALL RUN.
   d. IF A CHILLER OR ASSOCIATED PUMP FAILURE IS DETECTED, THE CHILLER AND PUMP SHALL BE SHUT DOWN AND THE NEXT CAPACITY STAGE SHALL BE IMPLEMENTED.
   e. THE SEQUENCE OF CHILLER RUN OPERATION WITH AN DECREASING CAPACITY REQUIREMENT IS AS FOLLOWS:
      1) SECONDARY FLOW LESS THAN 15 GPM – NO CHILLERS OPERATING.
      2) SECONDARY FLOW GREATER THAN 15 GPM AND LESS THAN 110 GPM – CHILLER 78-ARCU-2 SHALL RUN.
      3) SECONDARY FLOW LESS THAN 165 GPM AND GREATER THAN 110 GPM – CHILLER 78-ARCU-3 SHALL RUN.
      4) SECONDARY FLOW LESS THAN 290 GPM AND GREATER THAN 165 GPM – CHILLERS 78-ARCU-3 AND 78-ARCU-1 SHALL RUN.
   f. IF A CHILLER OR ASSOCIATED PUMP FAILURE HAS BEEN DETECTED IN THE STARTUP SEQUENCE OR DURING SYSTEM RUN, THE NEXT CAPACITY REDUCTION STAGE SHALL BE IMPLEMENTED.
3. SECONDARY PUMP OPERATION:
   a. THE PUMPS ARE TO BE CONTROLLED WITH A LEAD/LAG CONTROL OPERATION.
   b. THE LEAD PUMP SHALL BE SELECTED EITHER MANUALLY OR AUTOMATICALLY THROUGH THE BAS SYSTEM. AUTOMATIC ASSIGNMENT OF THE LEAD PUMP SHALL ALTERNATE 78-P-1 AND 78-P-2 ON A WEEKLY BASIS THROUGH THE BAS SYSTEM.
   c. UPON CALL FOR PUMP SYSTEM START, THE LEAD PUMP SHALL COMMANDED TO START.
   d. THE PUMP SHALL RAMP UP TO SPEED OVER A PERIOD OF 15 SECONDS.
   e. THE PUMP SPEED SHALL BE MODULATED TO MAINTAIN THE DIFFERENTIAL PRESSURE OF 8 PSI AS MEASURED BY DPT-4.
   f. UPON THE SPEED OF THE LEAD PUMP EXCEEDING 55 HZ, THE LAG PUMP SHALL BE STARTED. THE PUMP SHALL RAMP UP TO SPEED OVER A PERIOD OF 15 SECONDS.
   g. UPON THE SETPOINT OF DPT-4 BEING ATTAINED, BOTH PUMPS SHALL HAVE THE SAME SPEED COMMAND.
   h. IF BOTH PUMPS ARE OPERATING, AND THE SPEED COMMAND FALLS BELOW 42 HZ, THE LAG PUMP SHALL BE SHUT DOWN. NOTE THE 42 HZ IS A PRELIMINARY SETTING AND THIS SETTING SHOULD BE ADJUSTED TO ATTAIN STABLE OPERATION.
   i. IF ONLY ONE PUMP IS OPERATING AND FAILURE OF THAT PUMP IS DETECTED, THAT PUMP SHALL BE SHUT DOWN AND THE SECOND PUMP SHALL BE STARTED.
4. CHILLER START UP:
   a. ON A CALL FOR A CHILLER TO BE STARTED THE CHILLER SHALL BE ENABLED TO RUN.
   b. THE ASSOCIATED PRIMARY PUMP SHALL BE STARTED.
   c. UPON THE CHILLER'S SAFETIES BEING SATISFIED AND THE PROOF OF CHILLED WATER FLOW BY THE CHILLER'S FLOW DETECTION DEVICE, THE CHILLER SHALL START AND BE UNDER THE CAPACITY CONTROL OF THE CHILLER.
5. CHILLER SHUT DOWN:
   a. ON A CALL FOR A CHILLER TO BE SHUT DOWN THE CHILLER SHALL BE COMMANDED TO STOP.
   b. THE ASSOCIATED PRIMARY PUMP SHALL RUN FOR A PERIOD OF ONE MINUTE AFTER THE CHILLER HAS BEEN COMMANDED TO STOP. AFTER THE ONE MINUTE PERIOD, THE PUMP SHALL STOP.
6. FAULT AND EQUIPMENT SAFETY DETECTION:
   a. THE CHILLER AND ASSOCIATED PRIMARY PUMP WILL SHUT DOWN AND AN AUDIBLE AND VISUAL ALARM SHALL OCCUR THROUGH THE BAS BASED ON ANY SAFETY NOT BEING SATISFIED OR FAULT DETECTED.
   b. THE CHILLER'S CONTROL PANEL FAULT ALARM SHALL BE MONITORED BY THE BAS. IF A FAULT IS DETECTED, THE CHILLER AND ASSOCIATED PRIMARY PUMP SHALL BE SHUT DOWN.
   c. THE CHILLERS SHALL HAVE A PRESSURE DIFFERENTIAL TRANSMITTER ACROSS THE EVAPORATOR CHILLED WATER INLET AND OUTLET CONNECTIONS. THIS DIFFERENTIAL SHALL BE CONVERTED TO CHILLER FLOW, USING THE DESIGN PRESSURE DROP ACROSS THE CHILLER AT FULL FLOW AS THE REFERENCE. IF THIS FLOW FALLS BELOW 85 PERCENT OF THE RATED CHILLER FLOW, A FAULT WILL BE REPORTED. THE CHILLER WILL NOT SHUT DOWN UNTIL THE FLOW FALLS TO 75 PERCENT OF THE RATED FLOW.
   d. THE PRIMARY PUMPS SHALL HAVE A CURRENT SWITCH ON THE ELECTRICAL FEED TO THE PUMP MOTOR. IF THE PUMP IS IN A RUN CONDITION AND THE CURRENT IS NOT ABOVE A MINIMUM SETPOINT, A FAULT CONDITION SHALL BE REPORTED AND THE PUMP AND ASSOCIATED CHILLER SHALL BE SHUT DOWN.
   e. THE SECONDARY PUMPS HAVE A VFD DRIVE. THE AMP DRAW OF THE PUMP SHALL BE REPORTED THROUGH THE BACNET COMMUNICATIONS WITH THE BAS. UPON START UP OF THE PUMP, AFTER 15 SECONDS, TO ALLOW THE PUMP TO ATTAIN MINIMAL OPERATING SPEED, OR AFTER THE PUMP START UP, IF THE PUMPS DO NOT DRAW MORE THAN 15 PERCENT OF THE FULL DESIGN AMPERAGE, A PUMP FAILURE SHALL BE ASSUMED. THE PUMP SHALL BE SHUT DOWN AND THE OTHER SECONDARY PUMP, IF NOT PRESENTLY RUNNING, SHALL START.
      1) A VFD FAILURE AS REPORTED THROUGH THE BACNET COMMUNICATION SHALL BE TREATED AS A SAFETY NOT BEING SATISFIED.
      2) SHUT DOWN PROCEDURE SHALL BE THE SAME AS THE GENERAL SHUT DOWN DESCRIBED ABOVE.

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

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SDVOSB cVe

Drawing Title: MECHANICAL PROPOSED CHILLED WATER CONTROL DIAGRAM

Approved: Project Director

Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: PNL | Drawn: JAS

Project Number: 528-A6-13-602

Building Number: BLDG. #78

Drawing Number: M505

Dwg. 85 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

POINTS SUMMARY - HOT WATER GENERATION

SYSTEM COMPONENT	Point ID	SYSTEM OUTPUT				SYSTEM SENSOR INPUTS						DIGITAL COMMUNICATIOS				SYSTEM SOFTWARE/CONTROL						
		Binary		Analog		Binary	Analog									Alarm Processing			Application/Function			
		Electric	Pneumatic	Electric	Pneumatic	Status	Temperature	Pressure	Humidity	Flow	Current	VFD Speed (hz)	VFD Amps	VFD Fault		Equipment Status	Low Limit	High Limit	Lead/Lag	Start/Stop	Value	System Graphic
SUPPLY WATER DIFFERENTIAL PRESSURE	DPT-1							•									•	•				•
SUPPLY WATER TEMPERATURE	TT-3						•										•	•				•
SUPPLY WATER TEMPERATURE	TT-1						•										•	•				•
SUPPLY WATER TEMPERATURE	TT-2						•										•	•				•
PUMP P8 START/STOP	SST P8	•																	•			
PUMP P8 SPEED	SPD P8			•																	•	•
PUMP P8 STATUS	DI P8	•												•							•	•
PUMP P8 VFD FAULT	COMM													•								•
PUMP P8 AMPS	COMM												•									•
PUMP P8 SPEED	COMM											•										•
PUMP P9 START/STOP	SST P9	•																	•			
PUMP P9 SPEED	SPD P9			•																	•	•
PUMP P9 STATUS	DI P9	•												•								•
PUMP P9 VFD FAULT	COMM													•							•	•
PUMP P9 AMPS	COMM												•									•
PUMP P9 SPEED	COMM											•										•
STEAM CONTROL VALVE	HX-1 ZC			•																	•	•
STEAM CONTROL VALVE	HX-2 ZC			•																	•	•

HOT WATER HEAT EXCHANGER CONTROL SEQUENCES

A. SYSTEM DESCRIPTION:

1. TWO, 50 PERCENT OF SYSTEM CAPACITY, STEAM TO HOT WATER HEAT EXCHANGERS 78-HX-1 AND 78-HX-2. EACH WITH A SINGLE (100 PERCENT CAPACITY OF ASSOCIATED HEAT EXCHANGER) STEAM, ELECTRIC, V-PORT BALL VALVE (RATED FOR 260 DEGREE SERVICE), MODULATING, NORMALLY OPEN, TWO-WAY CONTROL VALVE.
2. TWO, 50 PERCENT OF SYSTEM CAPACITY, VARIABLE SPEED HOT WATER PUMPS.

B. CONTROL PRIMARY CIRCULATING PUMPS:

1. PUMPS TO HAVE LEAD-LAG CONTROL FUNCTION BUILT INTO THE DDC CONTROLLER. UPON PUMP FAILURE DETECTION, IF ONLY ONE PUMP IS RUNNING, THE OTHER PUMP SHALL BE ENERGIZED.
2. INPUT DEVICE: PUMP STATUS THROUGH DIGITAL INTERFACE OF PUMP VFD, DIFFERENTIAL PRESSURE SENSOR DPT-1, DDC SYSTEM.
3. OUTPUT DEVICE: DDC SYSTEM COMMAND OF START/STOP AND SPEED SIGNAL TO PUMP VFDS.
4. ENERGIZE A PUMP WHEN ANY AIR UNIT IS RUNNING IN NORMAL, NIGHTTIME TEMPERATURE MAINTENANCE OR MORNING WARM UP MODE. PUMP STARTUP SHALL INCORPORATE A 15 SECOND RAMP UP TO SPEED.
5. MODULATE PUMP VFD SPEED TO MAINTAIN DIFFERENTIAL PRESSURE SETPOINT OF 8 PSI OF DISTRIBUTION PIPING SYSTEM AS SENSED BY DPT-1.
6. THE SECOND PUMP SHALL BE ENERGIZED TO RUN IF THE FIRST PUMP SPEED IS GREATER THAN 58 HZ. THE STARTUP OF THE SECOND PUMP SHALL INCLUDE A 15 SECOND RAMP UP TO OPERATING SPEED. THE SECOND PUMP SHALL DE-ENERGIZE WHEN THE OPERATING SPEED REDUCES TO 42 HZ. BOTH OPERATING PUMPS SHALL RECEIVE THE SAME SPEED SIGNAL.
7. THE REDUCTION TO ONE PUMP OPERATION AT 42 HZ IS AN INITIAL ESTIMATED VALUE. THIS VALUE SHALL BE FIELD ADJUSTED TO ACQUIRE STABLE OPERATION.

C. HOT WATER SUPPLY TEMPERATURE CONTROL:

1. ACTION: MODULATE STEAM CONTROL VALVES TO MAINTAIN HEATING-WATER SUPPLY TEMPERATURE, AS SENSED BY TT-3, SETPOINT OF 180 DEGREES. USE THE SAME POSITION CONTROL SIGNAL TO BOTH STEAM VALVES.

D. SYSTEM FAULT DETECTION:

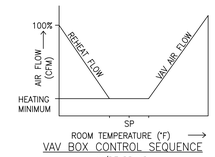
1. AFTER A ONE MINUTE SYSTEM STARTUP, TO ALLOW TEMPERATURE STABILIZATION, THE TEMPERATURE SENSED BY TT-3 SHALL BE WITHIN 10 DEGREES OF SETPOINT. IF NOT AN ALARM SHALL BE DISPLAYED. NO SYSTEM RESPONSE SHALL BE TAKEN BY THIS CONDITION.
2. TEMPERATURE TRANSMITTERS TT-1 AND TT-2 SHALL BE USED TO ESTABLISH INCORRECT OPERATION OF THE STEAM TO HOT WATER HEAT EXCHANGERS AND THEIR ASSOCIATED STEAM CONTROL VALVES. IF AFTER ONE MINUTE AFTER SYSTEM STARTUP, THE TEMPERATURE SENSED BY THESE TRANSMITTERS IS 15 DEGREES ABOVE OR BELOW THE SUPPLY WATER SETPOINT, AN ALARM SHALL BE DISPLAYED. NO SYSTEM RESPONSE SHALL BE TAKEN BY THIS CONDITION.
3. PUMP FAILURE IS TO BE DETECTED BY MONITORING THE PUMP STATUS THROUGH THE PUMP VFD DIGITAL COMMUNICATION INTERFACE. A VFD FAULT CONDITION OR PUMP OPERATING AMPERAGE LESS THAN 15 PERCENT OF FULL LOAD AMPS SHALL INDICATE PUMP FAILURE. ALARM SHALL BE DISPLAYED. IF ONLY ONE PUMP IS OPERATING, THAT PUMP SHALL BE DE-ENERGIZED AND THE SECOND PUMP SHALL BE STARTED. IF BOTH PUMPS ARE OPERATING, THE PUMP WITH FAULT SHALL BE SHUT DOWN AND THE REMAINING PUMP SHALL OPERATE.
4. DISPLAY:
   a. OPERATING STATUS OF PRIMARY CIRCULATING PUMPS.
   b. PUMP SPEED
   c. PUMP STATUS
   d. PIPING DIFFERENTIAL PRESSURE.
   e. VFD POWER USAGE (KW)
   f. VFD PERCENT OF FULL CAPACITY POWER (%)
   g. VFD FAULT CONDITION.
   h. DISCHARGE TEMPERATURE OF 78-HX-1 DISCHARGE TEMPERATURE OF 78-HX-1 HOT WATER SUPPLY TEMPERATURE (TT-3)

MISCELLANEOUS CONTROL SYSTEMS

A. ALL CONTROLS FOR THE FOLLOWING SYSTEMS ARE TO BE LOCAL (NOT THROUGH THE BAS SYSTEM) CONTROL SYSTEMS:

B. ATTIC VENTILATION:

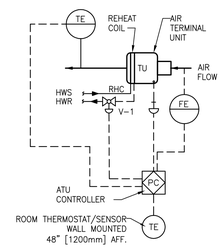
1. ATTIC VENTILATION CONSISTS OF AN EXHAUST FAN THAT IS TO BE CONTROLLED TO OPPERATE IN UNISON AND ACTIVATED BY A SINGLE SNAP ACTING THERMOSTAT.
   a. UPON THE SPACE TEMPERATURE RISING ABOVE THE SPACE TEMPERATURE SETPOINT OF 85 DEGREES, THE EXHAUST FAN SHALL BE ENERGIZED.
   b. THE ELECTRIC DAMPERS ASSOCIATED WITH THE OUTDOOR AIR INTAKE AND EXHAUST DISCHARGE FAN SHALL OPEN WHEN THE FAN MOTOR IS ENERGIZED. PROVIDE TRANSFORMER AS NECESSARY TO PROVIDE CORRECT VOLTAGE TO DAMPER OPERATOR FROM THE FAN POWER CIRCUIT.
   c. THE REVERSE SHALL OCCUR WHEN THE FAN IS DE-ENERGIZED.



VAV BOX CONTROL SEQUENCE

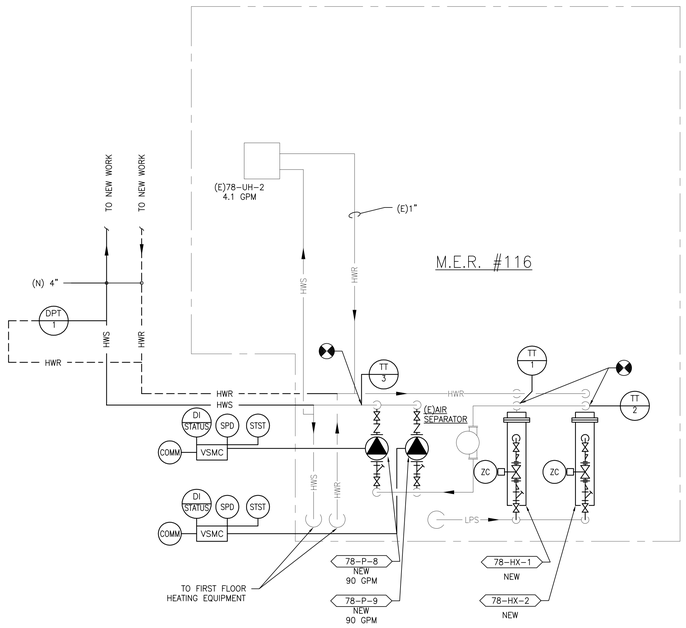
W/DEADBAND

A. SET POINTS SHALL BE SET AS FOLLOWS:
   COOLING 75°F (ADJ)
   HEATING 70°F(ADJ)
   DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE BELOW THE HEATING SETPOINT, THE VAV DAMPER AND VALVE V-1 WILL MODULATE OPEN TO MAINTAIN SET POINT ±.5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.;
D. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



1 VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

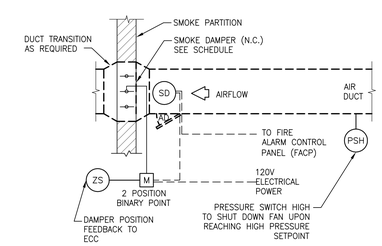
NTS



2 PROPOSED HOT WATER CONTROL DIAGRAM

NTS

REFER TO DWG. M504 FOR CONTROL SYMBOL LIST FOR NEW PIPING REFERENCE DRAWINGS



NOTE:
UPON DETECTION OF SMOKE BY THE SMOKE DETECTOR, THE SMOKE DAMPER SHALL CLOSE & SEND AN ALARM TO THE ECC.

3 SMOKE DAMPER CONTROL DIAGRAM

NTS

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

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Drawing Title: MECHANICAL DETAILS - AUTOMATIC CONTROLS	Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER	Project Number: 528-A6-13-602	Office of Construction and Facilities Management
Approved: Project Director	Location: VAMC, BATH, NEW YORK	Building Number: BLDG. #78	
	Date: 08-06-2015 / Checked: PL / Drawn: VRR	Drawing Number: M506	Department of Veterans Affairs
		Dwg. 86 of 140	

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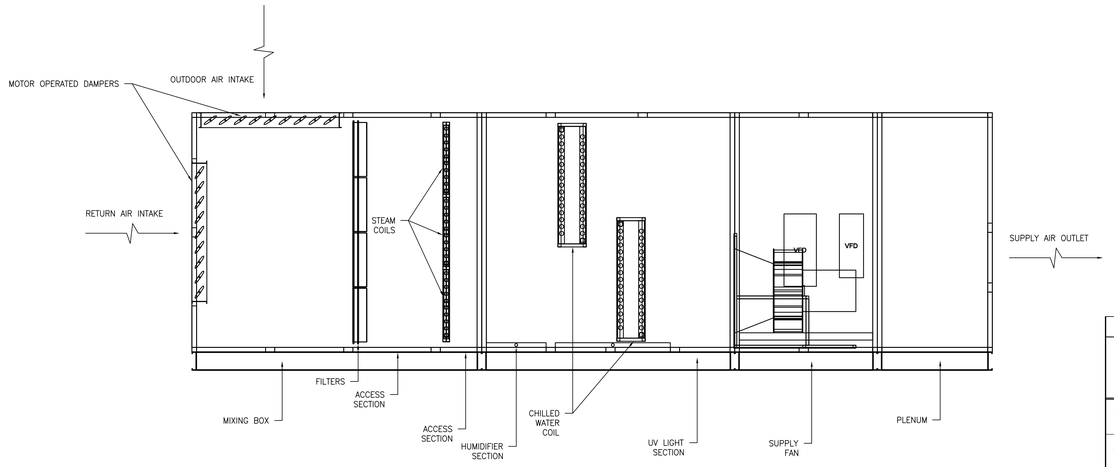

1 TYPICAL AIR HANDLING UNIT COMPONENTS
SCALE: NONE

AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	AIR FLOW	AIR FLOW SUPPLY CFM	AIR FLOW MIN OA CFM	AIR FLOW RETURN CFM	SUPPLY FAN MARK	RETURN OR RELIEF FAN MARK	EXHAUST FAN MARK	PREFILTER MARK	AFTER FILTER MARK	FINAL FILTER MARK	HEAT RECOVERY MARK	PREHEAT COIL MARK	COOLING COIL MARK	REHEAT COIL	HUMIDIFIER MARK	BASIS OF DESIGN
78-AHU-1	ATTIC	2ND & 3RD WEST	MODULAR CENTRAL STATION	VAV	20,045	7270	12775	78-SF-1	N/A	78-EF-1	78-PF-1	78-AF-1	N/A	N/A	78-SHC-1	78-CC-1	AT TU	78-H-1	McQUAY CAH041GDGM
78-AHU-2	ATTIC	2ND & 3RD EAST	MODULAR CENTRAL STATION	VAV	25,485	9150	16335	78-SF-2	N/A	78-EF-2	78-PF-2	78-AF-2	N/A	N/A	78-SHC-2	78-CC-2	AT TU	78-H-2	McQUAY CAH049GDGM

NOTE

1. PROVIDE VARIABLE FREQUENCY DRIVES.
2. INSTALL EQUIPMENT PER THE MANUFACTURERS INSTALLATION INSTRUCTIONS.
3. PROVIDE A 6" HIGH EQUIPMENT CURB BASIS OF DESIGN THYBAR MODEL TC-6.
4. PROVIDE UV LIGHT.
5. CONTRACTOR TO COORDINATE THE UNITS PHYSICAL SIZE WITH THE NEW LOCATION FOR INSTALLATION.

STEAM HUMIDIFER SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SEVICE	HUMIDIFIER TYPE	AIR FLOW	# OF MANIFOLDS	EAT Db	EAT Wb	EAT DEWPOINT	LAT DEWPOINT	SOURCE	STEAM PRESS ENT VALVE	STEAM PRESS ENT HEATER	TRAP FLOW	TRAP CAPACITY	BASIS OF DESIGN
				CFM		°F	°F	°F	°F		PSIG	PSIG	LBS/HR	LBS/HR	
78-H-1	ATTIC	78-AHU-1	UNIT-MOUNTED DISPERSION TUBE	20045	1	55	48.2	41.8	50.5	CLEAN STEAM	15	10	204.7	306	NORTEC
78-H-2	ATTIC	78-AHU-2	UNIT-MOUNTED DISPERSION TUBE	25485	1	55	48.9	43.5	50.5	CLEAN STEAM	15	10	213.1	320	NORTEC

NOTE:
1. INSTALL EQUIPMENT PER THE MANUFACTURERS INSTRUCTIONS.

AIR COOLED CHILLER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	CAPACITY	# OF COMP	MAX kW/TON	MIN COP	MAX IPLV (kW/TON)	EVAPORATOR FLOW	EVAPORATOR EWT	EVAPORATOR LWT	EVAPORATOR MAX WPD	FOULING FACTOR	CONDENS AMBIENT OA TEMP	ELECTRICAL COMPRESSOR MOTOR # COMP	HP	PHASE	VOLT	CONDENSER FAN MOTORS # FANS	NOMINAL HP	PHASE	VOLT	REMARKS
				TONS					GPM	°F	°F	FT		°F									
78-ACRU-3	ON GRADE	BLDG 78	SCROLL	75	4	1.1	3	0.77	176	55	45	V	0.0001	95	4	35	3	208	6	1.6	3	208	BASIS OF DESIGN TRANE CGAM 080A2A

NOTES

1. SEE SPECIFICATIONS FOR OTHER APPLICABLE ENGINEERING REQUIREMENTS.
2. "MAX kW/TON" AND "MIN COP" SPECIFIED ARE AT DESIGN CONDITIONS INDICATED. kW/TON INCLUDES CONDENSER FANS.
3. PROVIDE FACTORY APPLIED HEAT TRACE AND INSULATION FOR FREEZE PROTECTION ON ALL WATER PIPING AND EVAPORATOR FOR EXPOSURE TO WEATHER AND AMBIENT CONDITIONS TO -5° F.
4. INSTALL PER THE MANUFACTURERS INSTALLATION INSTRUCTIONS.
5. PROVIDE UL LISTING, FACTORY INSULATION, BACNET INTERFACE, AND ELASTOMERIC ISOLATORS.

FAN SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW	TSP	FAN TYPE	WHEEL	CLASS	ARRANGEMENT, ROTATION, AND DISCHARGE	DIAMETER	MIN % EFF	DRIVE	FAN MAX RPM	MOTOR ELECTRICAL NOMINAL POWER BHP	NOMINAL POWER HP	PHASE	VOLT	RPM	SPEED CONTROL	CONTROL SEQUENCE	REMARKS
				CFM	IN					IN											
1-SF1	ATTIC	2ND & 3RD WEST	78-AHU-1	20045	4.6	CENTRIFUGAL PLENUM	AIRFOIL	II	PLENUM FAN, AXIAL DISCHARGE	33	55%	DIRECT	1620	21.5	30	3	208	1750	VARIABLE		PROVIDE PIEZOMETER INLET FLOW SENSOR, VARIABLE FRQUENCY DRIVE
1-SF2	ATTIC	2ND & 3RD EAST	78-AHU-2	25485	4.8	CENTRIFUGAL PLENUM	AIRFOIL	II	PLENUM FAN, AXIAL DISCHARGE	36.5	62%	DIRECT	1465	28.5	40	3	208	1750	VARIABLE		PROVIDE PIEZOMETER INLET FLOW SENSOR, VARIABLE FREQUENCY DRIVE
78-EF-1	ATTIC	2ND & 3RD WEST	GENERAL EXHAUST	20045	2.25	UTILITY	BW	II	ARR 10, CW ROTATION, UPBLAST	33	52%	BELT	1517	14.3	20	3	208	1750	VARIABLE		PROVIDE PIEZOMETER INLET FLOW SENSOR
78-EF-2	ATTIC	2ND & 3RD EAST	GENERAL EXHAUST	25485	2.5	UTILITY	BW	II	ARR 10, CW ROTATION, UPBLAST	33	43%	BELT	1517	23.9	30	3	208	1750	VARIABLE		PROVIDE PIEZOMETER INLET FLOW SENSOR

NOTE

1. ALL SELECTIONS ARE BASED ON AN ALTITUDE OF 1325 FT. ABV MSL.
2. INSTALL THE EQUIPMENT PER THE MANUFACTURES INSTALLATION INSTRUCTIONS.

AIR FILTER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	MERV RATING	AIR FLOW	APD INITIAL	APD CHANGEOVER	HOUSING TYPE	CARTRIDGES #	CARTRIDGES SIZE (IN.) H x W x D	ARRANGEMENT	REMARKS
					CFM	IN. H_2O	IN. H_2O					
78-PF-1	ATTIC	2ND & 3RD FLOOR WEST SIDE	78-AHU-1	7	19630	0.2	1	SIDE	12	24 x 20 x 2	3 WIDE BY 4 HIGH	----
									4	24 x 12 x 2	4 HIGH	
78-AF-1	ATTIC	2ND & 3RD FLOOR WEST SIDE	78-AHU-1	11	19630	0.4	1.5	SIDE	12	24 x 20 x 2	3 WIDE BY 4 HIGH	----
									4	24 x 12 x 2	4 HIGH	----
78-PF2	ATTIC	2ND & 3RD FLOOR EAST SIDE	78-AHU-2	7	23755	0.21	1	SIDE	12	24 x 24 x 2	3 WIDE BY 4 HIGH	----
									4	24 x 12 x 2	4 HIGH	
78-AF-2	ATTIC	2ND & 3RD FLOOR EAST SIDE	78-AHU-2	11	23755	0.42	1.5	SIDE	12	24 x 24 x 2	3 WIDE BY 4 HIGH	----
									4	24 x 12 x 2	4 HIGH	----

PUMP SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	CIRCULATING FLUID FLUID	FLOW GPM	HEAD FT	NPSH REQUIRED FT	TEMPERATURE °F	SP GR	MIN % EFF	ELECTRICAL MOTOR NOMINAL POWER HP	PHASE	VOLT	MAX RPM	SPEED CONTROL	BASIS OF DESIGN
78-P-1	116 MER	BLDG 78	SECONDARY CHILLED WATER	END SUCTION	WATER	225	70	7.4	45	1	75	7.5	3	208	1750	VARIABLE	B & G 1510 2-1/2 BB
78-P-2	116 MER	BLDG 78	SECONDARY CHILLED WATER	END SUCTION	WATER	225	70	7.4	45	1	75	7.5	3	208	1750	VARIABLE	B & G 1510 2-1/2 BB
78-P-8	116 MER	BLDG 78	HOT WATER	INLINE	WATER	90	40	3.6	190	1	65	2	3	208	1750	VARIABLE	B & G 80 2-1/2 X2-1/2 X 7
78-P-9	116 MER	BLDG 78	HOT WATER	INLINE	WATER	90	40	3.6	190	1	65	2	3	208	1750	VARIABLE	B & G 80 2-1/2 X2-1/2 X 7
78-P-10	116 MER	BLDG 78	PRIMARY CHILLED WATER	END SUCTION	WATER	175	40	10	55	1	60	5	3	208	1750	CONSTANT	B & G 1510 2BC

NOTE
1. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.
2. PROVIDE VARIABLE FREQUENCY DRIVES FOR 78-P-1, 2, 8 AND 9

STEAM HEATING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	APPLICATION	AIR FLOW	MAX FACE VELOCITY	APD	TEMPERATURES EAT	TEMPERATURES LAT	TOTAL MIN CAPACITY	STEAM ENT CONT VALVE	STEAM ENT COIL	STEAM FLOW	STEAM STEAM TRAP	REMARKS
					CFM	FPM	IN WG	°F	°F	MBH	PSIG	PSIG	LBS/HR	LBS/HR	
78-SHC-1	ATTIC	2ND & 3RD FL WEST	78-AHU-1	PREHEAT	20,045	553	0.08	43.2	83.1	875.2	15	10	919	(3) @ 919	(3) COILS REQUIRED
78-SHC-2	ATTIC	2ND & 3RD FL EAST	78-AHU-2	PREHEAT	25,485	583	0.09	43.4	82.3	1,084.2	15	10	1138	(3) @ 1138	(3) COILS REQUIRED

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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SDVOSB

Drawing Title: MECHANICAL SCHEDULES

Approved: Project Director

Project Title: RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: MS

Project Number: 528-A6-13-602

Building Number: BLDG. #78

Drawing Number: M601

Dwg. 87 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

SPLIT SYSTEM AIR CONDITIONER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	TOTAL SUPPLY AIR FLOW	COOLING CAPACITY						ELECTRICAL DATA				BASIS OF DESIGN
					MIN TOTAL CAPACITY	MIN SENS CAPACITY	MIN SEER	EAT		COMP Kw	INDOOR FAN	MCA	MOCP	VOLT	
								Db	Wb						
				CFM	MBH	MBH		°F	°F		HP				
78-SSIU1	2ND FLOOR	DATA	DUCTLESS SPLIT	500	18	13.7	18.6	80	67	[2]	FRAC.	0.4	15	208/1/60	DAIKIN FAQ18PVJU
78-SSIU2	2ND FLOOR	LOW VOLTAGE	DUCTLESS SPLIT	325	9	5.6	18	80	67	[2]	FRAC.	0.4	15	208/1/60	DAIKIN FTXN09KEVJU5

NOTES
1. PROVIDE WIRELESS REMOTE CONTROL, CONDENSATE PUMP.
2. PROVIDE REMOTE MOUNTED THERMOSTAT.
3. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.

AIR COOLED CONDENSING UNIT SCHEDULE (AIR CONDITIONING SERVICE)

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	MIN REFRIGERATION	REFRIGERANT	OA TEMP	MIN SEER	ELECTRICAL				BASIS OF DESIGN
									RLA	MCA	MOCP	VOLTAGE	
					MBH		°F						
78-SSOU1	ON GRADE	2ND FL DATA ROOM	78-SSIU1	SCROLL	18000	R-410A	95	18.6	7.1	16.5	20	208/1/60	DAIKIN RZQ18PVJU9
78-SSOU2	ON GRADE	2ND FL LOW VOLTAGE ROOM	78-SSIU2	SCROLL	9000	R-410A	95	18	3.6	4.3	20	208/1/60	DAIKIN RKN09KEVJU5

NOTES
1. UL-RATED STARTERS SHALL BE FURNISHED BY MANUFACTURER OF EQUIPMENT.
2. kW/TON INCLUDES CONDENSER FANS.
3. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.

STEAM CONDENSATE PUMP SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE UNIT	FLOW EACH PUMP	DISCHARGE PRESSURE	MIN RECEIVER SIZE	MOTOR				REMARKS
							NOMINAL POWER	PHASE	VOLT	RPM	
				GPM	PSIG	GAL	HP				
78-CP-1	ATTIC	AHU-1	DUPLEX	9	15	23	(2) 1/3	1	120	3500	---
78-CP-2	ATTIC	AHU-2	DUPLEX	9	15	23	(2) 1/3	1	120	3500	

NOTE
1. PROVIDE LOW NPSH PUMPS SUITABLE FOR UP TO 210° F.
2. PROVIDE U.L. LISTED CONTROL PANEL.
3. INSTALL PER MANUFACTURERS INSTRUCTIONS.

INTAKE/EXHAUST HOOD SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	APPLICATION	THROAT SIZE	AIR FLOW	APD	DAMPER TYPE	REMARKS
					IN	CFM	IN		
78-EH-1	ROOF	78-AHU-1	LOUVERED PENTHOUSE	EXHAUST	84 x 42	20045	0.1	BACKDRAFT	---
78-EH-2	ROOF	78-AHU-2	LOUVERED PENTHOUSE	EXHAUST	84 x 48	25485	0.12	BACKDRAFT	----

NOTE:
1. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.
2. PROVIDE SLOPED ROOF CURB.

AIR DEVICE SCHEDULE

SYMBOL	DESCRIPTION	NECK SIZE	FLOW RANGE	NO. SLOTS	SLOT WIDTH	MAX. P.D.	BLOW PATTERN	MAX. N.C.	REMARKS	BASIS OF DESIGN
		(IN.)	(CFM)		(IN.)	(IN. WG)				
CD-1	24x24 CEILING DIFFUSER	6ø	100-175	-	-	0.08	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
CD-2	24x24 CEILING DIFFUSER	8ø	175-250	-	-	0.08	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
CD-3	24x24 CEILING DIFFUSER	10ø	250-325	-	-	0.08	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
CD-4	24x24 CEILING DIFFUSER	12ø	325-400	-	-	0.08	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
CD-5	24x24 CEILING DIFFUSER	14ø	400-475	-	-	0.08	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
CD-6	12x12 CEILING DIFFUSERT	4ø	35-65	-	-	0.1	4 WAY UNLESS NOTED OTHERWISE	20	SEE NOTES	TITUS / OMNI
LSD-1	4'-0" LONG LINEAR SLOT DIFFUSER	6ø	0-100	2	3/4	0.1	2-WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
LSD-2	4'-0" LONG LINEAR SLOT DIFFUSER	8ø	101-170	3	3/4	0.1	2-WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
LSD-3	4'-0" LONG LINEAR SLOT DIFFUSER	10ø	171-330	3	3/4"	0.1	2 WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
LSD-4	5'-0" LONG LINEAR SLOT DIFFUSER	6ø	0-125	2	3/4	0.1	2-WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
LSD-5	5'-0" LONG LINEAR SLOT DIFFUSER	8ø	126-200	3	3/4	0.1	2-WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
LSD-6	5'-0" LONG LINEAR SLOT DIFFUSER	10ø	201-400	3	3/4"	0.1	2 WAY ADJUSTABLE	25	SEE NOTES	TITUS / ML-38
RR-1	24x24 PERFORATED RETURN REGISTER	6x6	0-100	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-2	24x24 PERFORATED RETURN REGISTER	8x8	105-180	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-3	24x24 PERFORATED RETURN REGISTER	10x10	185-280	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-4	24x24 PERFORATED RETURN REGISTER	12x12	285-400	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-5	24x24 PERFORATED RETURN REGISTER	15x15	405-625	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-6	24x24 PERFORATED RETURN REGISTER	18x18	630-900	-	-	0.06	-	30	SEE NOTES	TITUS / PAR
RR-7	24x24 PERFORATED RETURN REGISTER	22x22	905-1300	-	-	0.06	-	35	SEE NOTES	TITUS / PAR
RR-9	ALUM. LOUVERED RET REG, 35 DEG, 3/4 IN.	12x30	0-1260	-	-	0.09	-	34	SEE NOTES	TITUS / 350FL
RR-10	ALUM. LOUVERED RET REG, 35 DEG, 3/4 IN.	22x30	1265-2150	-	-	0.07	-	34	SEE NOTES	TITUS / 350FL
ER-1	24x24 PERFORATED EXHAUST REGISTER	6x6	0-100	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA
ER-2	24x24 PERFORATED EXHAUST REGISTER	8x8	105-180	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA
ER-3	24x24 PERFORATED EXHAUST REGISTER	10x10	185-280	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA
ER-4	24x24 PERFORATED EXHAUST REGISTER	12x12	285-400	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA
ER-5	24x24 PERFORATED EXHAUST REGISTER	15x15	405-625	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA
ER-6	12x12 PERFORATED EXHAUST REGISTER	6x6	0-250	-	-	0.06	-	30	SEE NOTES	TITUS / PAR-AA

NOTES:
1. FLEXIBLE DUCT SIZE TO MATCH NECK SIZE.
2. ADJUST AIR DEVICE SIZE OR DESIGNATION WHERE AIR FLOW INDICATED ON THE DRAWINGS EXCEEDS SCHEDULED FLOW RANGE, MAX. P.D. OR MAX. N.C.
3. PROVIDE SQUARE TO ROUND ADAPTERS AS REQUIRED. PROVIDE FIELD FABRICATED PLENUMS WHERE FACTORY PLENUMS WILL NOT FIT DUE TO FIELD CONDITIONS.
4. PROVIDE PLASTER FRAMES FOR ALL AIR DEVICES MOUNTED IN PLASTER CEILINGS. SEE ARCHITECTURAL REFLECTED CEILING PLANS.
5. PROVIDE 24x24 DROP PANEL FOR LAY-IN CEILING.
6. ALL SIZES INDICATED FOR T-BAR CEILINGS ARE NOMINAL - EXACT SIZE TO BE LESS TO ALLOW DEVICES TO LAY IN CEILING.
7. EACH SLOT TO BE INDEPENDENTLY ADJUSTABLE FOR BLOW DIRECTION & AIR VOLUME.
8. PROVIDE MANUFACTURERS PLENUM CONSTRUCTED OF GALVANIZED STEEL FOR ALL LSD. PLENUMS SHALL BE EXTERNALLY INSULATED.
9. PROVIDE INTERMEDIATE T-BARS BETWEEN ALL SLOTS AND ANY ADDITIONAL T-BARS REQUIRED FOR FULL SUPPORT OF AIR DEVICE ON CEILING GRID.
10. IN AREAS WITH RUNNING WATER (TOILET ROOMS, TUB ROOM, SPA, ECT) PROVIDE ALUMINUM SUPPLY RETURN AND EXHAUST DIFFUSERS.

CLEAN STEAM GENERATOR SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	SOURCE OF MAKEUP	WATER CONDITIONS		PRODUCED STEAM FLOW	STEAM PRESSURE		CONTROL VALVE	TRAP		REMARKS
						FLOW	EWT		ENT CONTROL VALVE	ENT HEAT EXCHANGER		# TRAPS	CAPACITY EACH	
						GPM	°F	LBS/HR	PSIG	PSIG	LBS/HR		LBS/HR	
78-CSG-1	ATTIC	2ND & 3RD FLOOR	AHU-1	STEAM EXCHANGE	SOFTENED CW	2.6	50	158	15	10	181	1	540	---
78-CSG-1	ATTIC	2ND & 3RD FLOOR	AHU-2	STEAM EXCHANGE	SOFTENED CW	2.6	50	214	15	10	247	1	740	

NOTE:
1. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.

CHILLED WATER COOLING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW	MAX FACE VELOCITY	ROWS	APD	EAT		LAT		TOTAL CAPACITY	SENSIBLE CAPACITY	CHILLED WATER				REMARKS
								Db	Wb	Db	Wb			FLOW	EWT	LWT	WPD	
				CFM	FPM		IN WG	°F	°F	°F	°F	MBH	MBH	GPM	°F	°F	FT	
78-CC-1	ATTIC	2ND & 3RD FL WEST	78-AHU-1	20,000	464	6	0.57	78.2	65.1	54.9	53.9	676.9	510.2	133.0	45	55	15.7	(2) COILS REQUIRED
78-CC-2	ATTIC	2ND & 3RD FL EAST	78-AHU-2	25,485	493	8	0.70	80.0	66.5	55.0	54.0	974.3	695.2	193.8	45	55	16.2	(2) COILS REQUIRED

NOTE
1. THE COOLING COIL FIN SPACING SHALL NOT EXCEED 132 FINS PER FOOT [400 FINS PER METER].
2. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.

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		CAPACITY	
					GPM	°F	°F	FT	PSIG	PSIG	LBS/HR	LBS/HR	
78-HX-1	MER 116	Bldg 78	HEATING WATER	SHELL & TUBE	90	170	190	0.5	15	10	921	1840	---
78-HX-2	MER 116	Bldg 78	HEATING WATER	SHELL & TUBE	90	170	190	0.5	15	10	921	1840	---

NOTE:
1. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

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Drawing Title: MECHANICAL SCHEDULES

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: MS

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

Drawing Number: M602

Dwg. 88 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

2ND FLOOR SINGLE DUCT AIR TERMINAL UNIT SCHEDULE - 78 AHU-2

MARK	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	SIZE	AIR FLOW		ADDITIONAL SOUND ATTUNATION REQUIRED	CONTROL TYPE	CONTROL SEQUENCE	REHEAT			HEATING COIL									REMARKS
				MAX	MIN							HTG		EAT	LAT	WATER				ROWS	
				CFM	CFM				HW	ELEC	NONE	CFM	MBH	(°F)	(°F)	GPM	EWT (°F)	LWT (°F)	PD/FT. WG		
2-TUS-01	275	78-AHU-2	5	165	140	NONE	VAV	5 DEGREE DEADBAND	x			140	7.3	55	101.5	0.7	190	168.6	0.3	1HC	----
2-TUS-02	276	78-AHU-2	6	260	165	NONE	VAV	5 DEGREE DEADBAND	x			165	8.1	55	98.9	0.8	190	169.2	0.3	1HC	
2-TUS-03	276A	78-AHU-2	5	200	120	NONE	VAV	5 DEGREE DEADBAND	x			120	11.1	55	115.1	0.6	190	152.1	0.1	2	
2-TUS-04	262	78-AHU-2	5	140	105	NONE	VAV	5 DEGREE DEADBAND	x			140	7.3	55	101.5	0.7	190	168.6	0.3	1HC	SET HEATING AIR FLOW AT 140 CFM
2-TUS-05	261	78-AHU-2	5	175	105	NONE	VAV	5 DEGREE DEADBAND	x			165	8.1	55	98.9	0.8	190	169.2	0.3	1HC	SET HEATING AIR FLOW AT 165 CFM
2-TUS-06	259	78-AHU-2	6	270	145	NONE	VAV	5 DEGREE DEADBAND	x			260	16.9	55	113.1	1.3	190	163.4	0.3	2	SET HEATING AIR FLOW AT 260 CFM
2-TUS-07	257	78-AHU-2	6	270	150	NONE	VAV	5 DEGREE DEADBAND	x			260	16.9	55	113.1	1.3	190	163.4	0.3	2	SET HEATING AIR FLOW AT 260 CFM
2-TUS-08	256	78-AHU-2	6	260	120	NONE	VAV	5 DEGREE DEADBAND	x			260	16.5	55	112.0	1.2	190	161.7	0.3	2	SET HEATING AIR FLOW AT 260 CFM
2-TUS-09	255	78-AHU-2	5	145	95	NONE	VAV	5 DEGREE DEADBAND	x			145	7.4	55	100.7	0.7	190	168.3	0.3	1HC	SET HEATING AIR FLOW AT 145 CFM
2-TUS-10	254	78-AHU-2	5	145	90	NONE	VAV	5 DEGREE DEADBAND	x			145	7.4	55	100.7	0.7	190	168.3	0.3	1HC	SET HEATING AIR FLOW AT 145 CFM
2-TUS-11	253	78-AHU-2	10	670	340	NONE	VAV	5 DEGREE DEADBAND	x			340	17.2	55	100.3	1.6	190	167.9	1.7	1HC	
2-TUS-12	252	78-AHU-2	8	520	230	NONE	VAV	5 DEGREE DEADBAND	x			230	11.4	55	99.4	1.1	190	168.7	0.7	1HC	
2-TUS-13	251	78-AHU-2	10	655	290	NONE	VAV	5 DEGREE DEADBAND	x			290	15.5	55	102.9	1.4	190	167.2	1.4	1HC	
2-TUS-14	250	78-AHU-2	10	680	350	NONE	VAV	5 DEGREE DEADBAND	x			350	17.6	55	100.1	1.7	190	168.7	1.8	1HC	
2-TUS-15	249	78-AHU-2	6	320	190	NONE	VAV	5 DEGREE DEADBAND	x			190	10.0	55	102.0	0.9	190	167.2	0.5	1HC	
2-TUS-16	248	78-AHU-2	6	260	135	NONE	VAV	5 DEGREE DEADBAND	x			135	6.5	55	97.9	0.7	190	171.0	0.3	1	
2-TUS-17	247	78-AHU-2	6	260	135	NONE	VAV	5 DEGREE DEADBAND	x			135	6.5	55	97.9	0.7	190	171.0	0.3	1	
2-TUS-18	246	78-AHU-2	10	525	250	NONE	VAV	5 DEGREE DEADBAND	x			250	11.9	55	97.8	1.2	190	169.5	0.3	1	
2-TUS-19	244	78-AHU-2	8	530	265	NONE	VAV	5 DEGREE DEADBAND	x			265	12.6	55	97.5	1.3	190	170.1	0.9	1HC	
2-TUS-20	243	78-AHU-2	10	690	320	NONE	VAV	5 DEGREE DEADBAND	x			320	16.7	55	101.7	1.6	190	168.6	1.7	1HC	
2-TUS-21	241	78-AHU-2	8	565	290	NONE	VAV	5 DEGREE DEADBAND	x			290	20.2	55	117.4	1.4	190	160.4	0.4	2	
2-TUS-22	240	78-AHU-2	8	375	195	NONE	VAV	5 DEGREE DEADBAND	x			195	10.1	55	101.4	0.9	190	166.9	0.5	1HC	
2-TUS-23	278	78-AHU-2	10	700	490	NONE	VAV	5 DEGREE DEADBAND	x			490	33.9	55	116.9	2.4	190	161.0	1.4	2	
2-TUS-24	238	78-AHU-2	4	60	60	NONE	VAV	5 DEGREE DEADBAND	x			60	3.9	55	113.3	0.5	190	173.9	0.2	1	
2-TUS-25	201	78-AHU-2	4	65	65	NONE	VAV	5 DEGREE DEADBAND	x			65	3.9	55	113.3	0.5	190	173.9	0.2	1	
2-TUS-26	C200-1	78-AHU-2	5	190	190	NONE	VAV	5 DEGREE DEADBAND	x			190	7.0	55	88.1	0.5	190	161.1	0.2	1	
2-TUS-27	C200-1	78-AHU-2	5	195	195	NONE	VAV	5 DEGREE DEADBAND	x			195	7.1	55	87.6	0.5	190	160.8	0.2	1	
2-TUS-28	277	78-AHU-2	6	285	235	NONE	VAV	5 DEGREE DEADBAND	x			235	7.7	55	84.2	0.5	190	158.6	0.2	1	
2-TUS-29	C200-13	78-AHU-2	6	345	345	NONE	VAV	5 DEGREE DEADBAND	x			345	10.7	55	82.7	0.6	190	153.5	0.3	1	
2-TUS-30	C200-13	78-AHU-2	6	350	350	NONE	VAV	5 DEGREE DEADBAND	x			350	10.7	55	82.4	0.6	190	153.4	0.3	1	
2-TUS-31	264	78-AHU-2	4	85	75	NONE	VAV	5 DEGREE DEADBAND	x			75	4.5	55	108.1	0.5	190	171.7	0.2	1	
2-TUS-32	266	78-AHU-2	6	275	140	NONE	VAV	5 DEGREE DEADBAND	x			140	6.1	55	94.3	0.5	190	164.8	0.2	1	
2-TUS-33	267	78-AHU-2	4	60	60	NONE	VAV	5 DEGREE DEADBAND	x			60	6.5	55	91.5	0.5	190	163.2	0.2	1	
2-TUS-34	265	78-AHU-2	4	65	60	NONE	VAV	5 DEGREE DEADBAND	x			60	3.9	55	113.3	0.5	190	173.9	0.2	1	
2-TUS-35	268	78-AHU-2	6	315	55	NONE	VAV	5 DEGREE DEADBAND	x			55	3.7	55	115.3	0.5	190	174.7	0.2	1	
2-TUS-36	270	78-AHU-2	7	430	135	NONE	VAV	5 DEGREE DEADBAND	x			135	6.8	55	99.8	0.5	190	162.3	0.2	1	
2-TUS-37	271	78-AHU-2	5	230	200	NONE	VAV	5 DEGREE DEADBAND	x			200	7.2	55	87.1	0.5	190	160.5	0.2	1	
2-TUS-38	C200-11	78-AHU-2	6	345	345	NONE	VAV	5 DEGREE DEADBAND	x			345	10.7	55	82.7	0.6	190	153.5	0.3	1	
2-TUS-39	C200-11	78-AHU-2	6	350	350	NONE	VAV	5 DEGREE DEADBAND	x			350	10.7	55	82.4	0.6	190	153.4	0.3	1	

NOTES:

1. "HC" INDICATES HIGH CAPACITY COIL
2. HEATING AIR FLOW SHALL EQUAL MINIMUM AIR FLOW UNLESS OTHERWISE NOTED.
3. INSTALL PER THE MANUFACTURES INSTRUCTIONS.
4. PROVIDE EACH TERMINAL UNIT WITH A THERMOSTAT.
5. THE CONTRACTOR IS RESPONSIBLE FOR TRANSITIONING FROM THE TREMINAL UNIT TO THE ASSOCIATED DUCT WORK.

2ND FLOOR SINGLE DUCT AIR TERMINAL UNIT SCHEDULE - 78 AHU-1

MARK	AREA AND/OR ROOM SERVED	SYSTEM AIR HANDLING	SIZE	AIR FLOW		ADDITIONAL SOUND ATTENATION REQUIRED	CONTROL TYPE	CONTROL SEQUENCE	REHEAT			HEATING COIL									REMARKS
				MAX	MIN							HTG		EAT	LAT	WATER				ROWS	
				CFM	CFM				HW	ELEC	NONE	CFM	MBH	(°F)	(°F)	GPM	EWT (°F)	LWT (°F)	PD/FT. WG		
1-TUS-01	214	78-AHU-1	10	820	465	NONE	VAV	5 DEGREE DEADBAND	X			465	21.3	55	96.0	2.3	190	171.0	2.9	1HC	----
1-TUS-02	213	78-AHU-1	10	640	290	NONE	VAV	5 DEGREE DEADBAND	X			290	13.2	55	95.9	1.4	190	170.5	0.3	1	
1-TUS-03	212	78-AHU-1	10	690	380	NONE	VAV	5 DEGREE DEADBAND	X			380	18.5	55	98.7	1.8	190	168.8	2.0	1HC	
1-TUS-04	211	78-AHU-1	6	265	145	NONE	VAV	5 DEGREE DEADBAND	X			235	15.4	55	113.8	1.1	190	161.2	0.2	2	SET HEATING AIR FLOW TO 235 CFM
1-TUS-05	210	78-AHU-1	6	260	135	NONE	VAV	5 DEGREE DEADBAND	X			135	7.1	55	102.4	0.7	190	169.0	0.3	1HC	
1-TUS-06	209	78-AHU-1	6	260	135	NONE	VAV	5 DEGREE DEADBAND	X			135	7.1	55	102.4	0.7	190	169.0	0.3	1HC	
1-TUS-07	231/232	78-AHU-1	5	230	200	NONE	VAV	5 DEGREE DEADBAND	X			200	7.2	55	87.1	0.5	190	160.5	0.2	1	
1-TUS-08	208	78-AHU-1	10	635	330	NONE	VAV	5 DEGREE DEADBAND	X			330	16.9	55	101.0	1.6	190	168.2	1.7	1HC	
1-TUS-09	C200-5/C200-4	78-AHU-1	6	340	340	NONE	VAV	5 DEGREE DEADBAND	X			340	8.7	55	78.0	0.5	190	154.2	0.2	1	
1-TUS-10	207	78-AHU-1	8	545	265	NONE	VAV	5 DEGREE DEADBAND	X			265	12.6	55	97.5	1.3	190	170.1	0.9	1HC	
1-TUS-11	230	78-AHU-1	8	430	135	NONE	VAV	5 DEGREE DEADBAND	X			135	6.8	55	99.8	0.5	190	162.3	0.2	1	
1-TUS-12	C200-5	78-AHU-1	6	335	335	NONE	VAV	5 DEGREE DEADBAND	X			335	8.7	55	78.2	0.5	190	154.4	0.2	1	
1-TUS-13	226-A	78-AHU-1	4	60	50	NONE	VAV	5 DEGREE DEADBAND	X			50	3.5	55	117.6	0.5	190	175.6	0.2	1	
1-TUS-14	205	78-AHU-1	10	705	320	NONE	VAV	5 DEGREE DEADBAND	X			320	16.7	55	101.7	1.6	190	168.6	1.7	1HC	
1-TUS-15	203	78-AHU-1	8	580	280	NONE	VAV	5 DEGREE DEADBAND	X			280	19.8	55	118.5	1.6	190	160.9	0.4	2	
1-TUS-16	202	78-AHU-1	6	320	160	NONE	VAV	5 DEGREE DEADBAND	X			160	8.0	55	99.6	0.8	190	169.5	0.3	1HC	
1-TUS-17	226	78-AHU-1	4	115	85	NONE	VAV	5 DEGREE DEADBAND	X			85	4.8	55	105.2	0.5	190	170.4	0.2	1	
1-TUS-18	223	78-AHU-1	5	150	110	NONE	VAV	5 DEGREE DEADBAND	X			150	7.5	55	99.9	0.7	190	167.9	0.3	1HC	SET HEATING AIR FLOW TO 150 CFM
1-TUS-19	222	78-AHU-1	5	175	110	NONE	VAV	5 DEGREE DEADBAND	X			175	8.5	55	98.6	0.9	190	170.5	0.4	1HC	SET HEATING AIR FLOW TO 175 CFM
1-TUS-20	220	78-AHU-1	6	290	145	NONE	VAV	5 DEGREE DEADBAND	X			290	18.1	55	110.8	1.2	190	163.5	0.4	2	SET HEATING AIR FLOW TO 290 CFM
1-TUS-21	C200-3	78-AHU-1	7	370	370	NONE	VAV	5 DEGREE DEADBAND	X			370	12.6	55	85.5	1.0	190	168.4	0.6	1HC	
1-TUS-22	227	78-AHU-1	6	275	140	NONE	VAV	5 DEGREE DEADBAND	X			140	6.1	55	94.3	0.5	190	164.8	0.2	1	
1-TUS-23	228	78-AHU-1	6	315	180	NONE	VAV	5 DEGREE DEADBAND	X			180	7.0	55	88.2	0.5	190	161.2	0.2	1	
1-TUS-24	218	78-AHU-1	6	290	150	NONE	VAV	5 DEGREE DEADBAND	X			290	18.1	55	110.8	1.4	190	163.5	0.4	2	SET HEATING AIR FLOW TO 290 CFM
1-TUS-25	217	78-AHU-1	6	270	120	NONE	VAV	5 DEGREE DEADBAND	X			270	17.2	55	111.9	1.3	190	162.9	0.3	2	SET HEATING AIR FLOW TO 270 CFM
1-TUS-26	C200-3/C200-4	78-AHU-1	7	340	340	NONE	VAV	5 DEGREE DEADBAND	X			340	8.7	55	78.0	0.5	190	154.2	0.2	1	
1-TUS-27	216	78-AHU-1	5	145	95	NONE	VAV	5 DEGREE DEADBAND	X			145	7.4	55	100.7	0.7	190	168.3	0.3	1HC	SET HEATING AIR FLOW TO 145 CFM
1-TUS-28	215	78-AHU-1	5	145	95	NONE	VAV	5 DEGREE DEADBAND	X			145	7.4	55	100.7	0.7	190	168.3	0.3	1HC	SET HEATING AIR FLOW TO 145 CFM

NOTES:

1. "HC" INDICATES HIGH CAPACITY COIL
2. HEATING AIR FLOW SHALL EQUAL MINIMUM AIR FLOW UNLESS NOTED OTHERWISE
3. PROVIDE EACH TERMINAL UNIT WITH A THERMOSTAT.
4. INSTALL PER THE MANUFACTURERS INSTRUCTIONS.
5. THE CONTRACTOR IS RESPONSIBLE FOR TRANSITIONING FROM THE TREMINAL UNIT TO THE ASSOCIATED DUCT WORK.

BID DOCUMENTS

FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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585-321-1210 www.gardnerplus.com

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KA PROJECT NUMBER: M023-03

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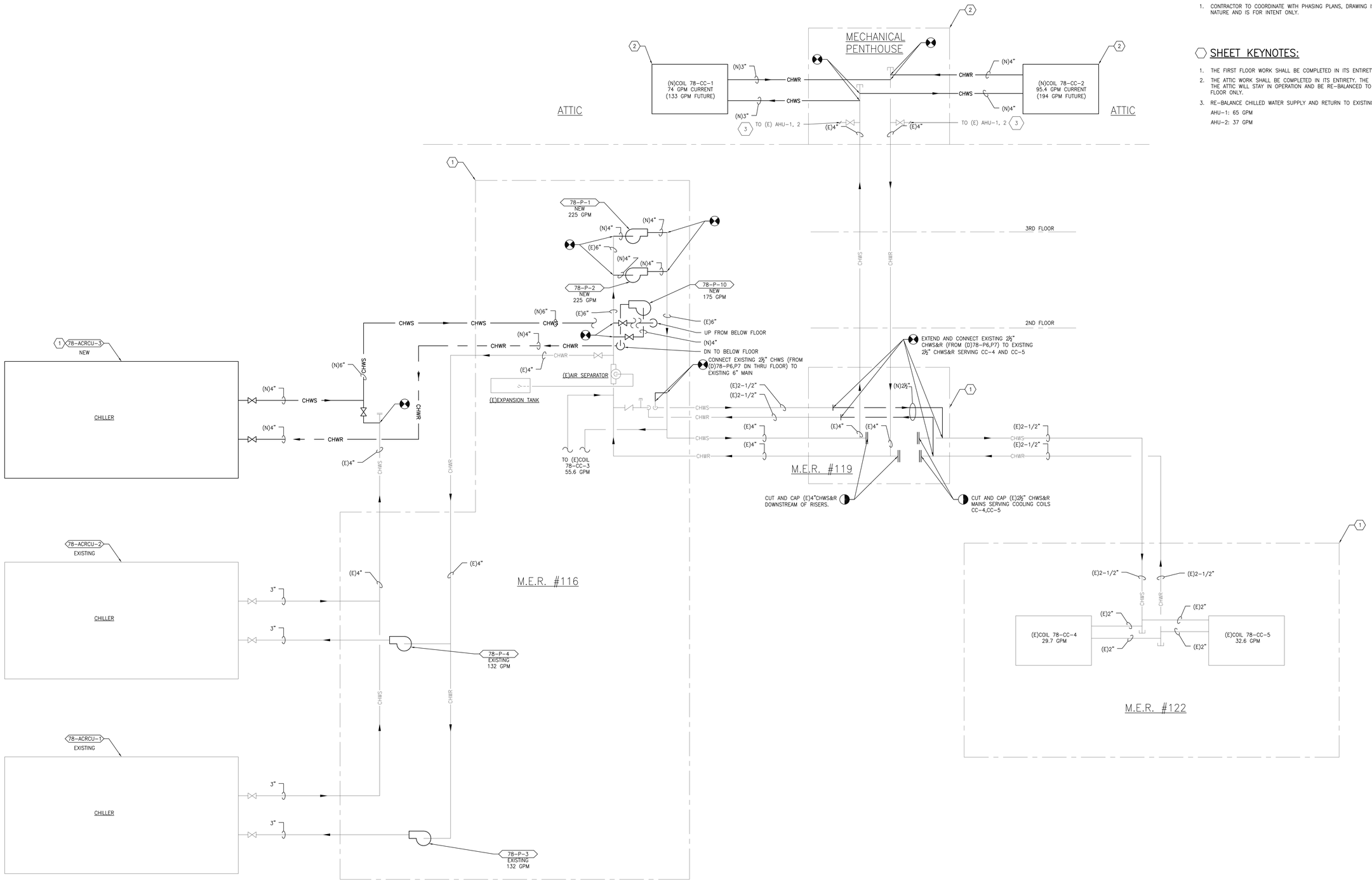
SDVOSB CVE

Drawing Title	MECHANICAL SCHEDULES
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	MS
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	M603
Dwg. 89 of 140	

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231



1 CHILLED WATER FLOW DIAGRAM
SCALE: NONE

GENERAL SHEET NOTES:

1. CONTRACTOR TO COORDINATE WITH PHASING PLANS, DRAWING IS DIAGRAMMATIC IN NATURE AND IS FOR INTENT ONLY.

SHEET KEYNOTES:

1. THE FIRST FLOOR WORK SHALL BE COMPLETED IN ITS ENTIRETY.
2. THE ATTIC WORK SHALL BE COMPLETED IN ITS ENTIRETY. THE EXISTING EQUIPMENT IN THE ATTIC WILL STAY IN OPERATION AND BE RE-BALANCED TO SUPPORT THE THIRD FLOOR ONLY.
3. RE-BALANCE CHILLED WATER SUPPLY AND RETURN TO EXISTING AHU'S AS FOLLOWS:

   AHU-1: 65 GPM

   AHU-2: 37 GPM

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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KA PROJECT NUMBER: M023-03

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A Service Disabled Veteran Owned Small Business
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SDVOSB CVE

Drawing Title: MECHANICAL CHILLED WATER FLOW DIAGRAM

Approved: Project Director

Project Title: **RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER**

Location: VAMC, BATH, NEW YORK

Date: 08-06-2015 | Checked: JAS | Drawn: JAS

Project Number: **528-A6-13-602**

Building Number: BLDG. #78

Drawing Number: M610

Dwg. 90 of 140

Office of Construction and Facilities Management

Department of Veterans Affairs

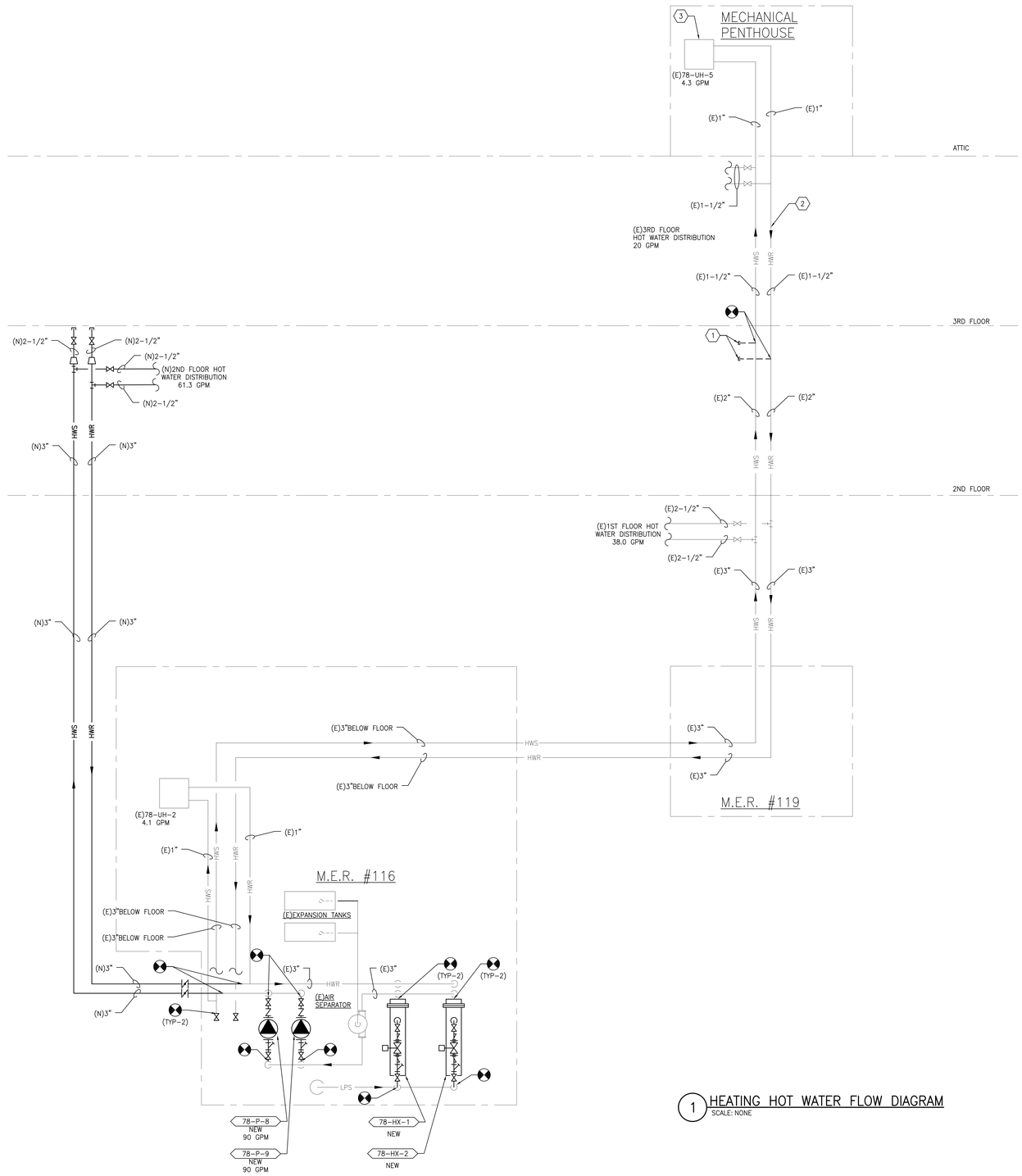
VA FORM 08-6231

GENERAL SHEET NOTES:

1. CONTRACTOR TO COORDINATE WITH PHASING PLANS, DRAWING IS DIAGRAMMATIC IN NATURE AND IS FOR INTENT ONLY.

SHEET KEYNOTES:

1. CUT AND CAP SECOND FLOOR PIPING.
2. THIRD FLOOR (E)PIPING TO REMAIN ACTIVE.
3. UNIT HEATER TO STAY IN SERVICE DURING CONSTRUCTION.



1 HEATING HOT WATER FLOW DIAGRAM
SCALE: NONE

BID DOCUMENTS
FULLY SPRINKLERED

NO.	DESCRIPTION	DATE

CONSULTANTS:

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CHERRY HILL, NEW JERSEY 08034
PHONE: (856)429-4000
FAX: (856)429-5002

SDVOSB CVE

Drawing Title	MECHANICAL HOT WATER FLOW DIAGRAM
Approved: Project Director	
Project Title	RENOVATION OF CLC 2 AT THE BATH VA MEDICAL CENTER
Location	VAMC, BATH, NEW YORK
Date	08-06-2015
Checked	JAS
Drawn	JAS
Project Number	528-A6-13-602
Building Number	BLDG. #78
Drawing Number	M611
Dwg. 91 of 140	

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231