MECHANICAL AND PLUMBING LEGEND

REFRIGERATION SYSTEM SYMBOLS

AD	AMMONIA DISCHARGE
AL	AMMONIA LIQUID
AR	AMMONIA RELIEF
AS	AMMONIA SUCTION
HGB	HOT GAS BYPASS
C	CONDENSER WATER SUPPLY
CR	CONDENSER WATER RETURN
CHWS	CHILLED–HOT WATER SUPPLY
CHWR	CHILLED–HOT WATER RETURN
GCWS	GLYCOL CHILLED WATER SUPPLY
GCWR	GLYCOL CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RD	REFRIGERANT DISCHARGE

HEATING SYSTEM SYMBOLS

LPS	LOW PRESSURE STEAM (0–15 PSI)
MPS	MEDIUM PRESSURE STEAM (15–50 PSI)
HPS	HIGH PRESSURE STEAM (ABOVE 50 PSI)
LPC	LOW PRESSURE CONDENSATE
MPC	MEDIUM PRESSURE CONDENSATE
HPC	HIGH PRESSURE CONDENSATE
PC	PUMPED CONDENSATE
BFW	FEED WATER
HTWS	HIGH TEMPERATURE HOT WATER SUPPLY
HTWR	HIGH TEMPERATURE HOT WATER RETURN
MTWS	MEDIUM TEMPERATURE HOT WATER SUPPLY
MTWR	MEDIUM TEMPERATURE HOT WATER RETURN
HWS	LOW TEMPERATURE HOT WATER SUPPLY
HWR	LOW TEMPERATURE HOT WATER RETURN
GHWS	GLYCOL HEATING WATER SUPPLY
GHWR	GLYCOL HEATING WATER RETURN
HCS	DUAL TEMPERATURE WATER SUPPLY
HCR	DUAL TEMPERATURE WATER RETURN
BBD	BOILER BLOW–DOWN
G	GAS
	F & T TRAP
	THERMODYNAMIC TRAP
	BUCKET TRAP
	THERMOSTATIC TRAP
F	FLOAT TRAP

MISCELLANEOUS PIPING SYMBOLS

A	COMPRESSED AIR
F	FIRE LINE
F	UNDER SLAB FIRE LINE
DE	DE–IONIZED WATER
DI	DISTILLED WATER
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
FOV	FUEL OIL VENT
HE	HELIUM
H	HYDROGEN
ICW	INDUSTRIAL COLD WATER
IHR	INDUSTRIAL HOT WATER RETURN
IHW	INDUSTRIAL HOT WATER SUPPLY
LN	LIQUID NITROGEN
LOX	LIQUID OXYGEN
LPG	LIQUID PETROLEUM GAS
NO	NITROUS OXIDE
N	NITROGEN
OX	OXYGEN
PN	PNEUMATIC TUBE RUN
VAC	VACUUM
VPD	VACUUM PUMP DISCHARGE
BR	BRINE RETURN
B	BRINE SUPPLY

PLUMBING SYSTEM SYMBOLS

ACID	ACID WASTE
ACID	ACID VENT
IW	INDUSTRIAL WASTE
MW	MAKE–UP WATER
WF	WALL FAUCET
WH	WALL HYDRANT
FCO	CLEAN OUT
FD	FLOOR DRAIN
WCO	WALL CLEAN OUT
SD	STORM DRAIN ABOVE FLOOR/FINISHED GRADE
SD	STORM DRAIN BELOW FLOOR/FINISHED GRADE
	INSTRUMENTATION PIPING
D	DRAIN PIPING
CD	CONDENSATE DRAIN PIPING
ID	INDIRECT DRAIN PIPING
NPW	NON–POTABLE WATER
RD	ROOF DRAIN PIPING
SF	SOFT WATER
	SANITIZING HOT WATER RETURN
	SANITIZING HOT WATER SUPPLY
SV	WASTE AND VENT COMBINATION
ATV	ATMOSPHERIC VENT
FILL	FILL LINE
H	HUMIDIFICATION LINE

NOTE:
SEE PLUMBING LEGEND FOR DOMESTIC SYSTEMS SYMBOLS.

VALVES + FITTINGS SYMBOLS

	REFRIGERANT STRAINER
	THERMOSTATIC EXPANSION VALVE
	GLOBE VALVE
	O, S, & Y GATE VALVE W/SUPERVISORY SWITCH
	GATE VALVE
	CHECK VALVE
	HOSE GATE VALVE
	PLUG VALVE OR BALANCING COCK
	NEEDLE VALVE
	STRAINER
	RELIEF VALVE
	MOTOR OPERATED CONTROL VALVE (2–WAY)
	MOTOR OPERATED CONTROL VALVE (3–WAY)
	TEMPERATURE REGULATING VALVE
	SOLENOID VALVE
	PRESSURE REDUCING VALVE
	FLOAT VALVE
	BUTTERFLY VALVE
	BALL VALVE
	BALANCING VALVE
	BOILER BLOW DOWN VALVE – SLOW OPENING
	BOILER BLOW DOWN VALVE – FAST OPENING
	CALIBRATED BRONZE BALANCING VALVE
PA	ANCHOR
	EXPANSION JOINT, SLIDING, WITH ANCHOR
	EXPANSION JOINT, BELLOWS
	PIPE GUIDE
	ELBOW
	TEE
	ELBOW DOWN
	ELBOW UP
	TEE DOWN
	TEE UP
	CAP
	UNION
	PIPE INCREASER OR DECREASER
	FLANGE
	BLIND FLANGE
	AIR VENT
	FLOW SWITCH
	VENTURI FLOW METER
	PRESSURE/TEMPERATURE TAP
	PRESSURE GAUGE
	WATER HAMMER ARRESTER
	HOSE CONNECTION W/CAP

MISCELLANEOUS SYMBOLS

	HEAVY LINE INDICATES NEW
	LIGHT LINE INDICATES EXISTING
	POINT OF CONNECTION OF NEW TO EXISTING
TS	TEMPERATURE SENSOR
TN	NIGHT SETBACK THERMOSTAT
TPB	PUSH BUTTON
	DIRECTION OF FLOW ARROW
	TO FIRE ALARM PANEL
	UNDERCUT DOOR

DUCTING + EQUIPMENT SYMBOLS

	SUPPLY DIFFUSER: NECK SIZE; DIFFUSER SYMBOL SEE SCHEDULE; DESIGN AIRFLOW (CFM); ARROWS INDICATE DIRECTION OF THROW
B	RETURN/EXHAUST GRILLE: GRILLE SYMBOL–SEE SCHEDULE
	FLARED SPIN–IN FITTING W/ MANUAL VOLUME DAMPER
	TRANSFER AIR OPENING
	OPPOSED BLADE DAMPERS
	PARALLEL BLADE DAMPERS
	UNIT HEATER (HORIZONTAL)
	POWER OR GRAVITY ROOF VENTILATOR – EXHAUST (ERV)
20/12	RECTANGULAR DUCT (1ST FIGURE, SIDE SHOWN 2ND FIGURE, SIDE NOT SHOWN)
	ACOUSTICAL LINING (DUCT DIMENSIONS FOR NET FREE AREA)
	DIRECTION OF FLOW
	DUCT SECTION (SUPPLY)
	DUCT SECTION (EXHAUST / RETURN)
R	INCLINED RISE (R) OR DROP (D) (ARROW IN DIRECTION OF FLOW)
	TRANSITIONS
	TRANSITION: ROUND TO RECTANGULAR
	STANDARD BRANCH FOR RECTANGULAR SUPPLY OR RETURN DUCT
	SPLITTER DAMPER
VD	MANUAL VOLUME DAMPER
M or M	MOTOR OPERATED DAMPERS
AD or AD	ACCESS DOOR (AD)
F	DYNAMIC FIRE DAMPER:
S	CLASS I SMOKE DAMPER
FS	CLASS I COMBINATION FIRE/SMOKE DAMPER
F	RADIANT DAMPER
SD	DUCT SMOKE DETECTOR
	HEAT STOP, FLOOR/CEILING OR ROOF/CEILING ASSEMBLY
	TURNING VANES
	FLEXIBLE DUCT
	FLEXIBLE CONNECTION
Ø	ROUND DUCT SYMBOL
	FLAT OVAL DUCT SYMBOL

GENERAL NOTES

MECHANICAL NOTES

1. NOT ALL DUCTWORK, PIPING, AND ACCESSORIES ARE NECESSARILY SHOWN IN THESE DRAWINGS, BUT WHAT WAS DEEMED NECESSARY TO SHOW INTENT OF WORK. REFER TO ALL OTHER PLANS, SECTIONS, DETAILS, SCHEDULES, AND SPECIFICATIONS FOR COMPLETE SYSTEM REQUIREMENTS.
2. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS PRIOR TO START OF ANY WORK, AND SHALL NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCY BETWEEN THE DRAWINGS AND THE ACTUAL FIELD CONDITIONS.
3. COORDINATE ALL PENETRATIONS OF FLOOR, ROOF, WALLS, ETC. WITH GENERAL CONTRACTOR. ALL PENETRATIONS THROUGH FIRE / SMOKE RATED CONSTRUCTION SHALL BE SEALED WITH A FIRE RATED CAULK EQUAL TO OR EXCEEDING THE CONSTRUCTION FIRE RATING.
4. FLEXIBLE AIR DUCTS SHALL CONFORM TO UL181 IN ACCORDANCE WITH SECTION 603.6 OF THE 2006 EDITION OF THE INTERNATIONAL MECHANICAL CODE. LENGTH OF FLEX DUCT SHALL NOT EXCEED 5 FT.
5. ALL MECHANICAL EQUIPMENT SHALL BE LABELED AS TO THE AREA(S) SERVED IN ACCORDANCE WITH SECTION 304.11 OF THE 2006 EDITION OF THE INTERNATIONAL MECHANICAL CODE.
6. PROVIDE ACCESS DOORS OR OTHER MEANS OF APPROVED ACCESS TO ALL FIRE DAMPERS AND FIRE/SMOKE DAMPERS. ACCESS DOORS SHALL BE LABELED ON THE ACCESS DOOR AND ON THE CEILING BELOW.
7. PROVIDE AND INSTALL BALANCING DAMPER AT EACH BRANCH TAKE–OFF OF SUPPLY AND EXHAUST AIR SYSTEMS. PROVIDE AND INSTALL BALANCING DAMPER AT EACH BRANCH TAKE–OFF OF RETURN SYSTEMS WHERE INDICATED.
8. MOUNT SPACE TEMPERATURE SENSORS, THERMOSTATS, OCCUPANCY SENSORS, AND REMOTE CONTROL DEVICES WITH CENTERLINE AT 46" AFF, UNLESS OTHER WISE NOTED.
9. ALL FRESH AIR INTAKES AND EXHAUST OPENINGS SHALL HAVE 1/4" MESH BIRD SCREENS.
10. PROVIDE BALANCING REPORT IN ACCORDANCE WITH THE 2006 EDITION OF THE INTERNATIONAL MECHANICAL CODE. SUBMIT TO THE RESIDENT ENGINEER AND CONTRACTING OFFICER FOR FINAL APPROVAL. PROVIDE BALANCING REPORT TO INSPECTOR AT TIME OF HEATING FINAL INSPECTION.
11. DUCTWORK SHALL BE SEALED IN ACCORDANCE WITH THE SPECIFICATIONS AND THE 2006 EDITION OF THE INTERNATIONAL ENERGY CONSERVATION CODE, SECTION 503.2.7.
12. PROVIDE AND INSTALL MANUAL AIR VENTS AT ALL HIGH POINTS AND DRAIN VALVES AT ALL LOW POINTS IN HYDRAUNIC PIPING.
13. CONTRACTOR TO ENSURE THAT EXISTING ASBESTOS IS REMOVED FROM EXISTING PIPING AND DUCTWORK IN THE PROJECT LIMIT AREA.
14. CONTRACTOR TO ENSURE THAT ANY NEW WORK DOES NOT CROSS THE CAT WALK AND IMPEDE THE TRAVEL WAY OF THE CAT WALK IN THE INTERSTITIAL SPACE.
15. AN ASBESTOS SURVEY, REPORT AND REMEDIATION WILL BE PERFORMED BEFORE WORK ON THIS PROJECT IS TO START. THIS WORK MAY COINCIDE WITH THE ASBESTOS REMEDIATION IF SO DEEMED APPROVED BY THE VA PROJECT MANAGER.
16. TOILET FIXTURES WILL BE MANUAL DUAL FLUSH. NO SENSORS
17. OCCUPANCY SENSORS FOR VAV BOXES REQUIRED FOR ROOMS 205,206,208,209,232,233,235. USE (ANDOVER)

PLUMBING NOTES

1. PLUMBING NOTES AND INSTALLATION REFERENCES PLEASE REFER TO PLUMBING DRAWINGS FOR INFORMATION.

Revisions | Date

Project No.

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1/4/2013

Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor	Drawing Title: MECHANICAL SYMBOL LEGEND	Project Title: NUCLEAR MEDICINE RELOCATION	Date: 01/04/2013	
Approved: Chief, Engineer	Approved: Safety Manager			Scale: NO SCALE	
	Approved: Environment of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 M-101.DWG	Location: SAN ANTONIO, TEXAS	Drawn By: DS
				Drawing No.: M-101	

Veterans Administration

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

MECHANICAL ABBREVIATIONS

A/E	ARCHITECT / ENGINEER
AAHX	AIR TO AIR HEAT EXCHANGER
AB	AIR BLENDER
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCH	AIR COOLED CHILLER
ACCU	AIR-COOLED CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
ACD	AUTOMATIC CONTROL DAMPER, MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER,TWO POSITION
AD	ACCESS DOOR
AF	AFTER FILTER
AFCV	AIR FLOW CONTROL VALVE
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR-HANDLING UNIT
AMP	AMPERAGE
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
AS	AIR SEPARATOR
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AW	AIR WASHER
AXF	AXIAL FLOW
BAS	BUILDING AUTOMATION SYSTEM
B	BOILER
BD	BUTTERFLY DAMPER
BDD	BACKDRAFT DAMPER
BDR	BASE BOARD RADIATOR
BFP	BACKFLOW PREVENTER
BFT	BOILER PLANT FIRE TUBE
BG	BOTTOM GRILLE
BHP	BRAKE HORSEPOWER
BHW	HOT WATER HEATING BOILER
BHX	BOILER BLOWDOWN HEAT EXCHANGER
BIW	BACKWARD INCLINED WHEEL (FAN)
BMT	BONE MARROW TRANSPLANT
BR	BOTTOM REGISTER
BSC	BIOLOGICAL SAFETY CABINETS
BT	BLOWOFF TANK
BTC	BLOWOFF TANK CONTROL VALVE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BWT	BOILER PLANT WATER TUBE
C	CENTIGRADE (CELSIUS)
CC	COOLING COIL
CCD	COOLING COIL CONDENSATE DRAIN
CD	CEILING DIFFUSER
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION1)
CD-2	CONSTRUCTION DOCUMENTS (SUBMISSION2)
CENT	CENTRIFUGAL
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET
CFP	CHEMICAL FEED PUMP
CG	CEILING GRILLE
CH	CHILL
CHP	CHILLED WATER PUMP
CHW	CHILLER WATER
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CI	CAST IRON
CM	CARBON MONOXIDE
CM	CUBIC METER
CM/S	CUBIC METER PER SECOND
CO	CLEAN OUT
COR	CONTRACTING OFFICER REPRESENTATIVE
COTR	CONTRACTING OFFICER TECHNICAL REP.
CO2	CARBON DIOXIDE
COMP	COMPRESSOR UNIT
COP	COEFFICIENT OF PERFORMANCE
CP	CONDENSATE PUMP
CR	CEILING REGISTER
CS	CONDENSATE STORAGE TANK
CSG	CLEAN STEAM GENERATOR
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CV	CONSTANT VOLUME
CW	COLD WATER (POTABLE)
CWCC	CHILLED WATER COOLING COIL
CWP	CONDENSER WATER PUMP
CWR	CONDENSER WATER RETURN (TO COOLING TOWER)
CWS	CONDENSER WATER SUPPLY (FROM COOLING TOWER)
D	DAMPER - AUTOMATIC
D-1	OUTDOOR AIR DAMPER
D-2	RETURN AIR DAMPER
D-3	RELIEF AIR DAMPER
DB	DECIBELS
Db	DRY-BULB TEMPERATURE
DD-1	DESIGN DEVELOPMENT (SUBMISSION1)
DD-2	DESIGN DEVELOPMENT (SUBMISSION2)
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DF	DIFFUSER
DI	DIAMETER
DIW	DEIONIZED WATER
DP	DEW POINT TEMPERATURE
DP	DIFFUSER PLATE
DPA	DIFFERENTIAL PRESSURE ASSEMBLY
DPS	DIFFERENTIAL PRESSURE SENSOR
DX	DIRECT EXPANSION
DXCC	DIRECT EXPANSION COOLING COIL
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EVAPORATIVE COOLER
ECC	ENGINEERING CONTROL CENTER
ECU	EVAPORATIVE CONDENSER UNIT
EDH	ELECTRIC DUCT HEATER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EGS	EMERGENCY GAS SHUTOFF
EGT	ENTERING GLYCOL TEMPERATURE
EH	EXHAUST HOOD
EJ	EXPANSION JOINT
EMD	END OF MAIN DRIP (STEAM)
ENT	ENTERING
ER	EXHAUST REGISTER
ERC	ELECTRIC REHEAT COIL
ERP	ELECTRIC RADIANT PANEL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
ETO	ETHYLENE OXIDE
EUH	ELECTRIC UNIT HEATER
EWC	EVAPORATIVE WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
F	FAHRENHEIT
F&T	FLOAT AND THERMOSTATIC
F/SDPR	COMBINATION FIRE SMOKE DAMPER
FA	FREE AREA
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT (4 PIPE)
FCUC	FAN COIL UNIT COOLING ONLY
FCUH	FAN COIL UNIT HEATING ONLY
FCW	FORWARD CURVED WHEEL (FAN)
FD	FLOOR DRAIN
FD	FIRE DAMPER
FF	FINAL FILTER
FHX	FLUE GAS/FEEDWATER HEAT EXCHANGER
FM	FLOW METER
FOP	FUEL OIL PUMP
FOT	FUEL OIL TANK
FOHX	FUEL OIL HEAT EXCHANGER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FPTU	FAN POWERED TERMINAL UNIT
FR	FLOOR REGISTER
FRP	FIBER REINFORCED POLYESTER
FSD	FIRE SHUTTER DAMPER
FS	FLOW SWITCH
FSTAT	FREEZESTAT
FT	FEET
FT-LB	FOOT-POUND
FTR	FIN TUBE RADIATION
FV	FACE VELOCITY
GA	GAUGE
GAL	GALLONS
GH	GRAVITY HOOD
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPR	GAS PRESSURE REGULATOR
GS	GALVANIZED STEEL
H	HUMIDIFIER
H&CW	HOT & COLD WATER
HAC	HOUSEKEEPING AID CLOSET
HB	HOSE BIBB
HC	HEATING COIL
HD	HEAD
HD	HOOD
HOA	HAND/OFF/AUTOMATIC
HP	HEAT PUMP
HP	HORSEPOWER
HPDT	HIGH PRESSURE DRIP TRAP
HPR	HIGH PRESSURE RETURN (STEAM CONDENSATE)
HPS	HIGH PRESSURE SUPPLY (STEAM)
HRC	HEAT RECOVERY COIL
HRD	HEAT RECOVERY DEVICE
HRP	HYDRAUNIC RADIANT (CEILING) PANEL
HRW	HEAT RECOVERY WHEEL
HSTAT	HUMIDISTAT
HTM	HUMIDIFIER TERMINAL
HUM	HUMIDIFIER UNIT MOUNTED
HVU	HEATING AND VENTILATING UNIT
HW	HOT WATER
HWC	HOT WATER COIL
HWHC	HOT WATER HEATING COIL
HWP	HEATING HOT WATER PUMP
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
HWUH	HOT WATER UNIT HEATER
HVD	HOISTWAY VENT DAMPER
HX	HEAT EXCHANGER
HZ	HERTZ
I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
IBT	INVERTED BUCKET TRAP
ICF	IN-LINE CENTRIFUGAL FAN
ICU	INTENSIVE CARE UNIT
ID	INSIDE DIAMETER
IFB	INTEGRAL FACE AND BYPASS
IN	INCHES
IN HG	INCHES OF MERCURY
IN WC	INCH WATER COLUMN
IN WG	INCH WATER GAUGE
IN-LB	INCH-POUND
IPLV	INTEGRATED PART LOAD VALUE
IRH	INFRARED HEATER
IS	INSECT SCREEN
IU	INDUCTION UNIT
IV	INLET VANES
J	INTENTIONALLY LEFT BLANK
kg	KILOGRAM
kg/HR	KILOGRAM PER HOUR
kPa	KILOPASCAL
kW	KILOWATT
kWh	KILOWATT HOUR
L	LITER
L/h	LITERS PER HOUR (OR LITERS/HOUR)
L/m	LITERS PER MINUTE (OR LITERS/MINUTE)
L/s	LITERS PER SECOND (OR LITERS/SECOND)
LAT	LEAVING AIR TEMPERATURE
LBS/HR	OUNDS PER HOUR
LF	LINEAR FOOT (FEET)
LGT	LEAVING GLYCOL TEMPERATURE
LH	LATENT HEAT
LPG	LIQUID PROPANE GAS
LPR	LOW PRESSURE RETURN (STEAM CONDENSATE)
LPRC	LOW PRESSURE STEAM RETURN (CLEAN)
LLHX	LIQUID TO LIQUID HEAT EXCHANGER
LPS	LOW PRESSURE STEAM
LPSC	LOW PRESSURE STEAM (CLEAN)
LSD	LINEAR SLOT DIFFUSER
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVG	LEAVING
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE
M	METER, SI UNIT
M/s	METERS PER SECOND (OR METERS/SECOND)
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MB	MIXING BOX
MBH	1000 BTUH
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MER	MECHANICAL EQUIPMENT ROOM
MERV	MINIMUM EFFICIENCY REPORTING VALUE
MH	MANHOLE
MHP	MOTOR HORSEPOWER
MIN	MINIMUM
MM	MILLIMETER
MOV	MOTOR OPERATED VALVE
MPR	MEDIUM PRESSURE RETURN (STEAM CONDENSATE)
MPS	MEDIUM PRESSURE STEAM
MRI	MAGNETIC RESONANCE IMAGING
MTD	MEAN TEMPERATURE DIFFERENCE
MVD	MANUAL VOLUME DAMPER
MZ	MULTI-ZONE
NA	NOT APPLICABLE
NCR	NOISE CRITERIA
NC	NORMALLY CLOSED
NG	NATURAL GAS
NGFM	NATURAL GAS FLOW-METER
NO	NORMALLY OPEN
NOAA	NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION
NOM	NOMINAL
NPLV	NON-STANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAG	OUTSIDE AIR GRILLE
OAI	OUTSIDE AIR INTAKE
OD	OUTSIDE DIAMETER
OFM	OIL FLOW-METER
OR	OPERATING ROOM
P	PUMP
PA	PASCAL
PC	PUMPED CONDENSATE
PCF	POUNDS PER CUBIC FOOT (FEET)
PD	PRESSURE DROP
PEF	PROPELLER (TYPE) EXHAUST FAN
PF	PRE-FILTER
PG	PRESSURE GAGE
PGW	PROPYLENE GLYCOL-WATER (SOLUTION)
PHC	PREHEAT COIL
PPM	PARTS PER MILLION
PRS	PRESSURE REGULATING (VALVE) STATION
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH- ABSOLUTE
PSIG	POUNDS PER SQUARE INCH- GAGE
PSS	PRIMARY SECONDARY SYSTEM
PSV	PRESSURE SAFETY VALVE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
R/E	RETURN OR EXHAUST
RA	RETURN AIR
RAD	REFRIGERANT AIR DRYER
RAF	RADIO FREQUENCY
RAHX	ROTARY AIR HEAT EXCHANGER
RAT	RETURN AIR TEMPERATURE
RCCH	REMOTE CONDENSER CHILLER
RCU	RECIPROCATING CHILLER UNIT
RD	REFRIGERANT DISCHARGE
RDS	ROOM DATA SHEETS
REA	RELIEF AIR
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID LINE
RLA	RUN LOAD AMPERE
RO	REVERSE OSMOSIS
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
RV	RELIEF VALVE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAT	SUPPLY AIR TEMPERATURE
SC	SHADING COEFFICIENT
SCFM	STANDARD CUBIC FEET PER MINUTE
SCI	SPINAL CODE INJURY
SCR	SILICON CONTROLLED RECTIFIER
SD	SMOKE DETECTOR
SD	SUPPLY AIR DIFFUSER
SD-1	SCHEMATIC DESIGN (SUBMISSION1)
SD-2	SCHEMATIC DESIGN (SUBMISSION2)
SDPR	SMOKE DAMPER
SDR	SMOKE DAMPER (RETURN)
SDS	SMOKE DAMPER (SUPPLY)
SEN	SENSIBLE HEAT
SF	SUPPLY FAN
SG	SUPPLY AIR GRILLE
SH	STEAM HUMIDIFIER
SHC	STEAM HEATING COIL
SI	SQUARE INCHES
SP	STATIC PRESSURE
SP GR	SPECIFIC GRAVITY
SPD	SUPPLY PROCESS AND DISTRIBUTION
SPRV	STEAM PRESSURE REDUCING VALVE
SPS	STATIC PRESSURE SENSOR
SQ FT	SQUARE FOOT (FEET)
SR	SUPPLY AIR REGISTER
SS	STAINLESS STEEL
SSHX	STEAM TO STEAM HEAT EXCHANGER
SSR	SOLID SEPARATOR
ST	STEAM TRAP
SUH	STEAM UNIT HEATER
SV	STEAM PRESSURE REDUCING VALVE
SVS	STEAM VENT SILENCER
SWHX	STEAM TO WATER HEAT EXCHANGER
T & PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
TAB	TESTING, ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TDH	TOTAL DYNAMIC HEAD
TDS	TOTAL DISSOLVED SOLIDS
TG	TRANSFER GRILLE
TP	TRAP
TR	TOP REGISTER
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TU	TERMINAL UNIT
TWU	THRU-WALL UNIT
UC	UNDER CUT
UC	UNIT COOLER
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY
URV	UP-BLAST UNIT VENTILATOR
V	VALVE
VAF	VANE-AXIAL FAN
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VFD	VARIABLE FREQUENCY DRIVE
VHA	VETERANS HEALTH ADMINISTRATION
VI	VIBRATION ISOLATOR
VIV	VARIABLE INLET VANES
VP	VACUUM PUMP
VPS	VARIABLE PRIMARY SYSTEM
VR	VACUUM (STEAM CONDENSATE) RETURN
VSD	VARIABLE SPEED DRIVE
VUH	VERTICAL UNIT HEATER
W	WATTS
WAG	WASTE ANESTHESIA GAS
Wb	WET-BULB (TEMPERATURE)
WC	WATER COOLED
WCCH	WATER COOLED CHILLER
WCCU	WATER COOLED CONDENSING UNIT
WCHP	WATER COOLED HEAT PUMPS
WCPU	WATER COOLED PACKAGED UNIT
WEF	WALL EXHAUST FAN
WF	WATER FILTER
WFCV	WATER FLOW CONTROL VALVE
WFM	WATER FLOW-METER
WFMD	WATER FLOW MEASURING DEVICE
WG	WATER GAGE
WPD	WATER SIDE PRESSURE DROP
YR	YEAR

Revisions	Date

Project No.

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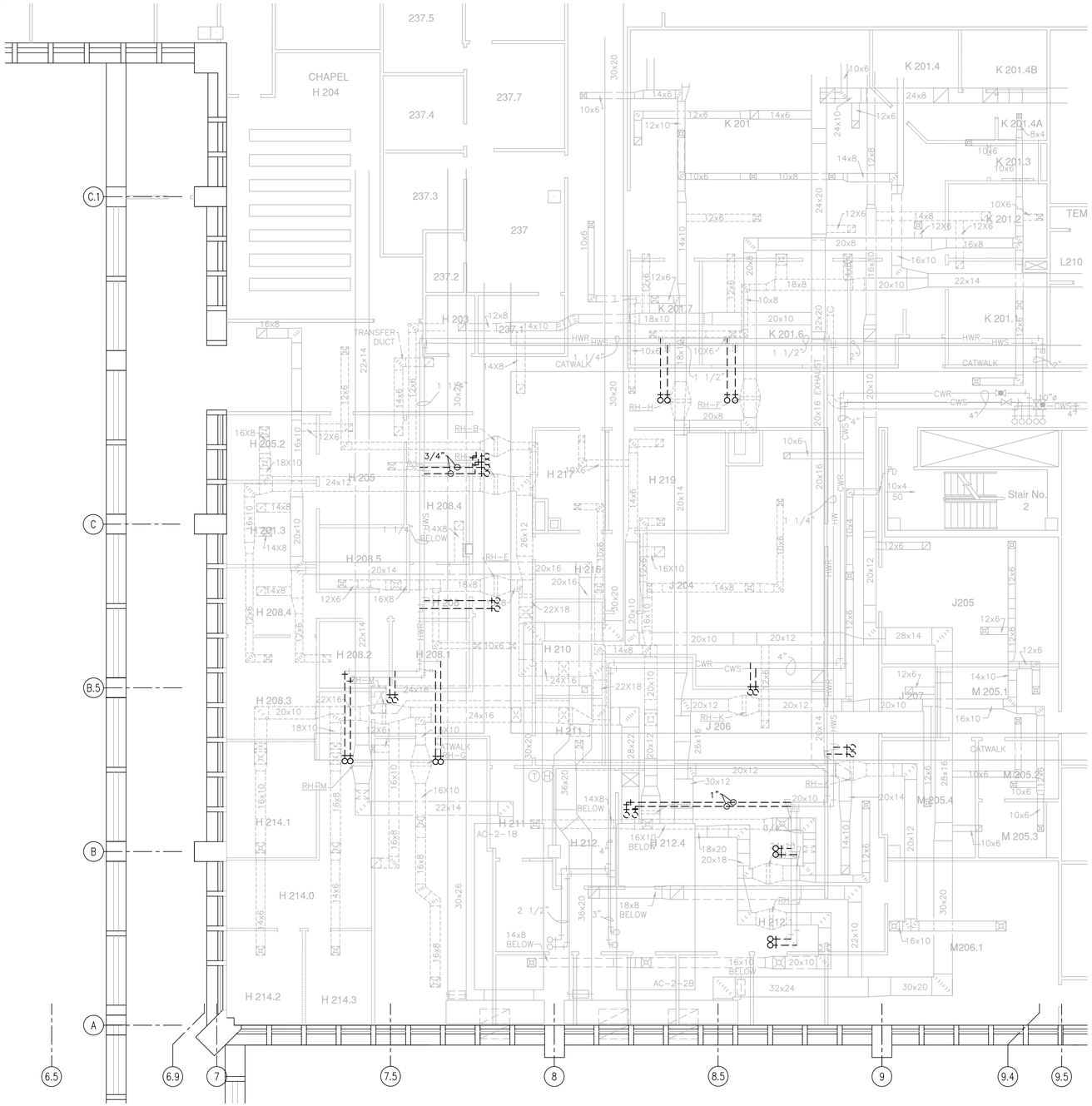
1/4/2013

Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor	Drawing Title: MECHANICAL ABBREVIATIONS		Project Title: NUCLEAR MEDICINE RELOCATION	Date: 01/04/2013
Approved: Chief, Engineer	Approved: Safety Manager				Scale: NO SCALE
	Approved: Environment of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS / Checked By: MZ / Drawn By: DS	Drawing No.: M-102
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 M-102.DWG	Location: SAN ANTONIO, TEXAS	

Veterans Administration



1 SECOND LEVEL MECHANICAL PIPING DEMOLITION PLAN

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

NORTH

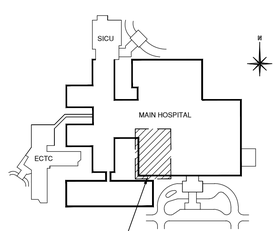
GENERAL NOTES

1. SEE SECOND LEVEL PHASING PLAN (SHEET A-101).

LEGEND

EXISTING TO REMAIN

TO BE DEMOLISHED



Revisions	Date
Project No.	

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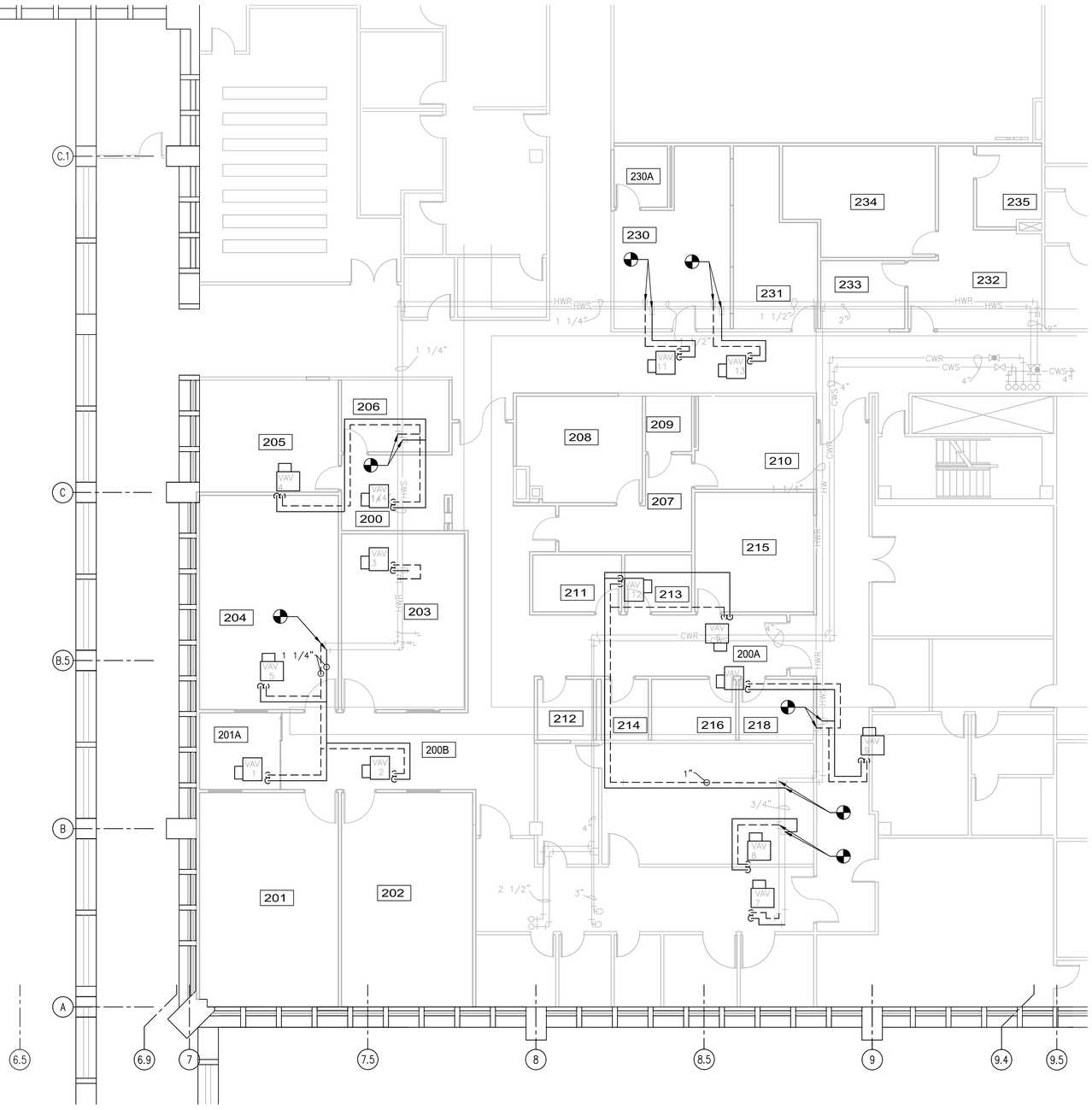
Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor	Drawing Title: SECOND LEVEL MECHANICAL PIPING DEMOLITION PLAN	Project Title: NUCLEAR MEDICINE RELOCATION	Date: 01/04/2013	
Approved: Chief, Engineer	Approved: Safety Manager			Scale: 1/8"=1'-0"	
	Approved: Environment of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ / Drawn By: DS
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 MH-103.DWG	Location: SAN ANTONIO, TEXAS	Drawing No.: M-103

Veterans Administration



GENERAL NOTES

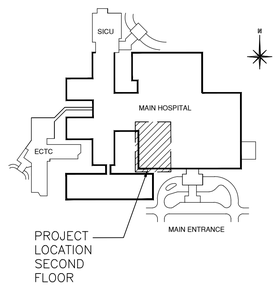
1. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE VA PROJECT MANAGER PRIOR TO START OF WORK.
2. SEE PHASING PLAN – SHEET A–100.
3. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO ANY WORK OR EQUIPMENT PROCUREMENT.
4. PIPE SIZES NOT NOTED ARE 3/4".

LEGEND

EXISTING TO REMAIN

NEW TO BE INSTALLED – HWR

NEW TO BE INSTALLED – HWS



1 SECOND LEVEL MECHANICAL PIPING PLAN

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

NORTH

Revisions	Date
Project No.	

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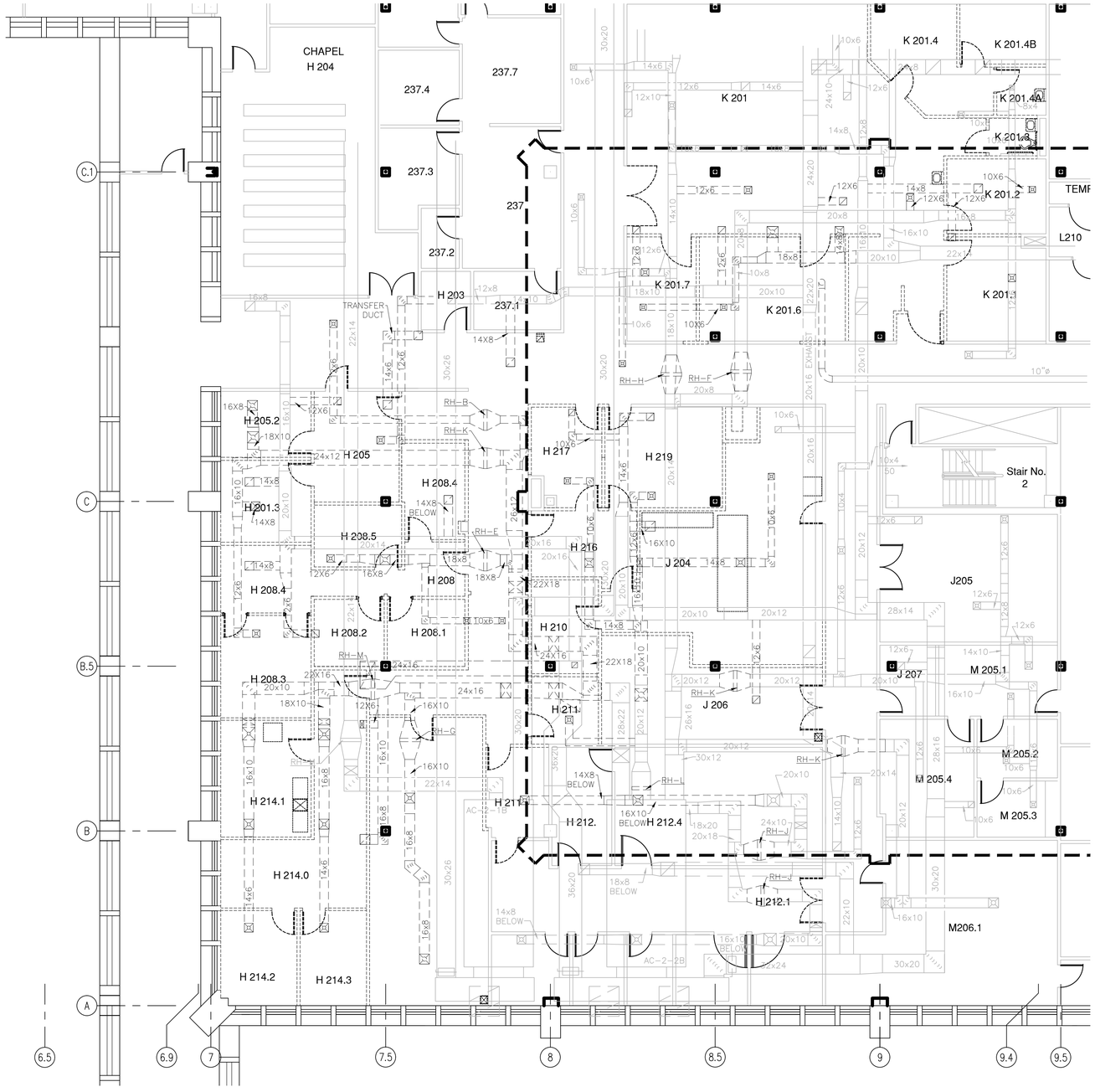
Approved: Chief, Engineer	Approved: Safety Manager
	Approved: Environment of Care Manager
	Approved: Facilities Service Line Manager

Drawing Title: SECOND LEVEL MECHANICAL PIPING PLAN	Project No.: 671-11-712	Contract No.: VA257-P-0249	Building No.: -
AutoCAD File Name: 671-11-712 MH-104.DWG	Location: SAN ANTONIO, TEXAS		

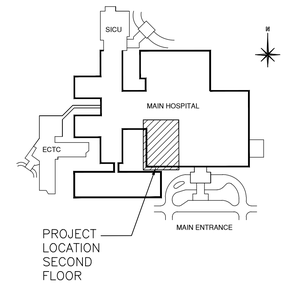
Project Title: NUCLEAR MEDICINE RELOCATION	Designed By: DS	Checked By: MZ	Drawn By: DS
Date: 01/04/2013	Scale: 1/8"=1'-0"	Drawing No.: M-104	Veterans Administration



LEGEND

EXISTING TO REMAIN

TO BE DEMOLISHED



1 SECOND LEVEL HVAC DEMOLITION PLAN

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

NORTH

Revisions	Date
Project No.	

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Approved: Chief, Engineer	Approved: Safety Manager			Scale: 1/8"=1'-0"	
	Approved: Environment Of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 MH-105.DWG	Drawn By: DS	Drawing No.: M-105
				Location: SAN ANTONIO, TEXAS	

Veterans Administration

1 SECOND LEVEL HVAC PLAN
SCALE: 1/8"=1'-0"

NORTH

GENERAL NOTES

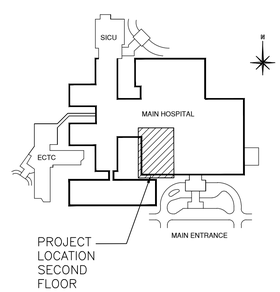
1. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE VA PROJECT MANAGER PRIOR TO START OF WORK.
2. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO ANY WORK OR EQUIPMENT PROCUREMENT.
3. FURNISH AND INSTALL NEW TEMPERATURE SENSORS TO REPLACE EXISTING THERMOSTATS FOR ALL ROOMS SERVED BY AC-2-2B.
4. LOCATE NEW VAV TERMINAL BOXES WHERE THEY CAN BE SERVICED FROM THE EXISTING CATWALK OR EXTEND THE CATWALK SO THEY CAN BE SERVICED FROM THE CATWALK.
5. DO NOT BLOCK THE CATWALK WITH NEW DUCTS OR PIPE. INSTALL ITEMS THAT RUN OVER THE CATWALK AS HIGH AS POSSIBLE.
6. HAVE FINAL ROUTING APPROVED BY THE CONTRACTING OFFICER BEFORE INSTALLATION.
7. PHASE 2 WILL NOT BE RELEASED FOR DEMOLITION UNTIL PHASE 1 IS COMPLETE AND FULLY OPERATIONAL.
8. SEE SECOND LEVEL PHASING PLAN A-100.

KEY NOTES:

1. EXHAUST, HOOD FURNISHED BY VA INSTALLED BY CONTRACTOR

   HOOD SPEC: QTY (1) 36" WIDE X 54" HIGH X 31.25" DEEP X54L2735K08 SAFEAIRE II RADIOISOTOPE CONSTANT VOLUME SUPERSTRUCTURE WITH INTEGRAL T304 STAINLESS STEEL LINER, REMOTE BAFFLE ADJUSTMENT, TWO-TUB T-8 FLUORESCENT LIGHT FIXTURE, BLACK LIGHT SWITCH, BLACK TWO 120V BLACK DUPLEX RECEPTACLES, AND BLACK FLUSH PLATES.

2. FURNISH AND INSTALL ROOM PRESSURE MONITOR ON CORRIDOR WALL. TSI MODEL 8631-HM-BAC OR APPROVED EQUAL.



Revisions | Date

Project No.

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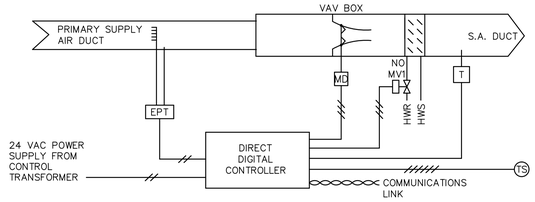
Approved: Chief, Engineer	Approved: Safety Manager			Scale: 1/8"=1'-0"	
	Approved: Environment of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ / Drawn By: DS
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 MH-106.DWG	Location: SAN ANTONIO, TEXAS	Drawing No.: M-106

Veterans Administration



VAV BOX W/HOT WATER REHEAT CONTROL

I/O SUMMARY TABLE

PROJECT:
DEPT OF VETERANS AFFAIRS
I/O CHANGES TO AC-2-2B

SYSTEM/POINT DESCRIPTION	QUANTITY REQUIRED	GRAPHIC DISPLAY	HARDWARE: OUTPUT: DIGITAL: CONTROL RELAY (INSTANTANEOUS)	CONTROL RELAY (LATCHING)	OFF/AUTO	OPEN/CLOSE	ANALOG: 4-20 MILLIAMP	CONTROL POINT ADJUSTMENT	POSITION ADJUSTMENT	ELECTRIC-PNEUMATIC TRANSDUCER	INPUT: DIGITAL: PRESSURE SWITCH	DIFFERENTIAL PRESSURE SWITCH	THERMOSTAT	CURRENT SWITCH	AUXILIARY CONTACT	STATUS CONTACT	SMOKE DETECTOR	PULSE	ANALOG: TEMPERATURE	HUMIDITY	CARBON DIOXIDE	PRESSURE	FLOW	4-20 MILLIAMP	CURRENT	ALARMS: DIGITAL: SMOKE DETECTOR	SAFETY SHUTDOWN	ANALOG: HIGH LIMIT	LOW LIMIT	RUN TIME	SOFTWARE: APPLICATION PROGRAMS: SCHEDULED START/STOP	OPTIMUM START/STOP	EVENT	TEMPERATURE CONTROL	DAY/NIGHT SETBACK	ECONOMIZER	ENTHALPY	VENTILATION/RECIRCULATION	HUMIDITY CONTROL	SET-POINT TEMPERATURE RESET	CHILLER DEMAND LIMIT	LOW SIGNAL SELECTION	PRESSURE CONTROL	FLOW CONTROL	ALARM INSTRUCTION	LOGS: ALL POINTS LOG	ALARM SUMMARY LOG	STATUS SUMMARY LOG	TIME EVENT LOG	TREND LOG	POWER FAILURE MODE	COMMUNICATIONS FAILURE MODE	NEW (N) EXISTING (E) POINT
VAV BOX WITH HW REHEAT																																																		
SPACE TEMPERATURE	*	Y																	X									X	X						X									X	X	X		X			N
LOCAL SET-POINT TEMPERATURE	*	Y																	X												X			X									X	X	X		X			N
PRIMARY AIRFLOW	*	Y																					X					X	X														X	X	X		X			N
PRIMARY AIR DAMPER CONTROL	*	Y							X																										X									X				X	C	N	N
HEATING COIL VALVE CONTROL	*	Y							X																										X									X				X	C	N	N
SUPPLY AIR TEMPERATURE	*	Y																	X									X	X						X									X	X	X		X			N
VARIABLE FREQUENCY DRIVE																																																			
DUCT STATIC PRESSURE	4	Y																					X																													N
DRIVE		Y															X								X		X	X			X	X															X			N	N

CODES FOR FAILURE MODE:
H – HIGH VALUE
L – LOW VALUE
O – ON OR OPEN
F – OFF OR CLOSED
C – LAST COMMAND
N – LOCAL LOOP
* – QUANTITY SHALL BE VERIFIED BY CONTRACTOR

SEQUENCE OF OPERATION (VAV BOX W/HOT WATER REHEAT COIL)

GENERAL: ALL SET-POINTS SHALL BE FULLY ADJUSTABLE AND SHALL BE ACCESSIBLE FROM THE BAS OPERATOR INTERFACE.

AIRFLOW: AN ELECTRONIC ANALOG FLOW SENSOR/TRANSMITTER SHALL SIGNAL THE DDC CONTROLLER OF VAV UNIT PRIMARY AIRFLOW. THE MINIMUM AND DESIGN PRIMARY AIRFLOW SET-POINTS SHALL BE REMOTELY RESET THROUGH THE BUILDING AUTOMATION SYSTEM.

SPACE SET-POINT TEMPERATURE: A SPACE MOUNTED ELECTRONIC ANALOG TEMPERATURE SENSOR SHALL SIGNAL THE DDC CONTROLLER OF SPACE TEMPERATURE. THE DDC CONTROLLER SHALL MODULATE THE PRIMARY AIR DAMPER AND HOT WATER CONTROL VALVE TO MAINTAIN SPACE TEMPERATURE SET-POINT. THE SET-POINT SHALL BE:

COOLING:	ABOVE 72 DEGREES F.
DEADBAND:	70-72 DEGREES F
HEATING:	BELOW 70 DEGREES F
ADMIN HEATING SETBACK:	65 DEGREES F.
MEDICAL HEATING SETBACK:	68 DEGREES F.

TEMPERATURE CONTROL: IN THE EVENT THE SPACE TEMPERATURE RISES ABOVE COOLING SET-POINT, MODULATE THE PRIMARY AIR DAMPER FROM MINIMUM TO OPEN. IN THE EVENT THE SPACE TEMPERATURE DROPS BELOW COOLING SET-POINT, MODULATE THE PRIMARY/INDUCTION AIR DAMPER FROM OPEN TO CLOSED UNTIL IT REACHES THE MINIMUM PRIMARY AIRFLOW POSITION. IN THE EVENT THE SPACE TEMPERATURE CONTINUES TO DROP BELOW HEATING SET-POINT, WITH THE PRIMARY AIR DAMPER IN THE MINIMUM PRIMARY AIRFLOW POSITION, POSITION THE HOT WATER CONTROL VALVE FROM CLOSED TO OPEN.

OCCUPANT OVERRIDE: THE OCCUPANT SHALL BE CAPABLE OF OVERRIDING THE SPACE TEMPERATURE SET-POINT IF ENABLED BY THE BAS OPERATOR. LIMIT THE OVERRIDE TEMPERATURE SET-POINT ADJUSTMENT TO WITHIN 3 DEGREES OF SET-POINT. INCLUDE NIGHT TIME AND AFTER HOURS SETBACKS.

CONSTANT VOLUME UNITS: FOR SPACES INDICATED TO HAVE THE SAME MINIMUM AIRFLOW AS MAXIMUM AIRFLOW, POSITION THE HOT WATER CONTROL VALVE TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT OR MEDICAL HEATING SETBACK TEMPERATURE IF IN UNOCCUPIED MODE.

SEQUENCE OF OPERATION (VARIABLE FREQUENCY DRIVE)

GENERAL: STATIC PRESSURE SETPOINT SHALL BE FULLY ADJUSTABLE AND SHALL BE ACCESSIBLE FROM THE BAS OPERATOR INTERFACE. OCCUPIED MODE SHALL BE FULLY ADJUSTABLE AND ACCESSIBLE FROM THE BAS OPERATOR INTERFACE.

STATIC PRESSURE CONTROL: SELECT THE LOWEST SIGNAL FROM THE FOUR SEPARATE DUCT BRANCHES AND MODULATE THE SPEED OF THE DRIVE TO MAINTAIN THE SETPOINT. DETERMINE THE MINIMUM SETPOINT BY COORDINATING WITH THE BALANCING SUB-CONTRACTOR.

START - STOP: ENABLE THE DRIVE WHEN THE AIR HANDLING UNIT IS IN OCCUPIED MODE. STOP THE DRIVE THEN THE AIR HANDLING UNIT IS NOT IN OCCUPIED MODE.

SAFETY OVERRIDES: STOP THE DRIVE WHEN COMMANDED BY THE FIRE ALARM SYSTEM OR LOCAL DUCT SMOKE SENSOR.

OCCUPANT OVERRIDE: THE OCCUPANT SHALL BE CAPABLE OF OVERRIDING THE VFD OPERATION IF ENABLED BY THE BAS OPERATOR.

SYSTEM GRAPHICS

GENERAL: FURNISH AND INSTALL ON EXISTING COMPUTER TERMINAL A FLOOR PLAN OF THE SECOND FLOOR WITH ROOM NUMBERS AND VAV TERMINAL UNIT NUMBERS AND LOCATIONS. INDICATE ON THE FLOOR PLAN THE ROOM WHERE THE ROOM SENSOR IS LOCATED AND THE TEMPERATURE BEING REPORTED AT THE SENSOR. SEE THE DDC POINTS LIST FOR ADDITIONAL GRAPHIC REQUIREMENTS.

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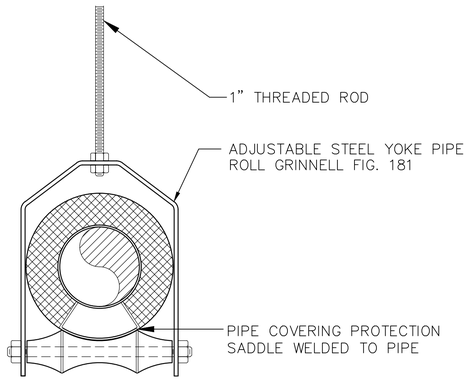
11-9-2013

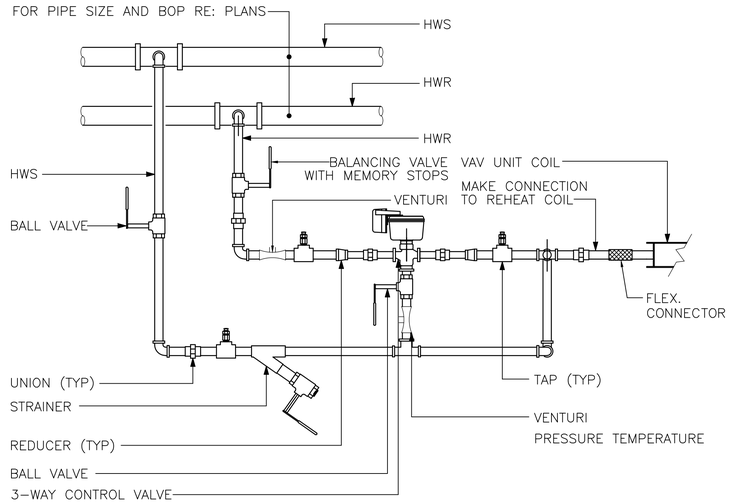
Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor
Approved: Chief, Engineer	Approved: Safety Manager
	Approved: Environment of Care Manager
	Approved: Facilities Service Line Manager

Drawing Title: MECHANICAL HVAC CONTROLS
Project No.: 671-11-712
Contract No.: VA257-P-0249
BUILDING No.: -
AutoCAD File Name: 671-11-712 M-107.DWG
Project Title: NUCLEAR MEDICINE RELOCATION
LOCATION: SAN ANTONIO, TEXAS
Designed By: DS
Checked By: MZ
Drawn By: DS
Date: 01/04/2013
Scale: 1/8"=1'-0"
Drawing No.: M-107

Veterans Administration

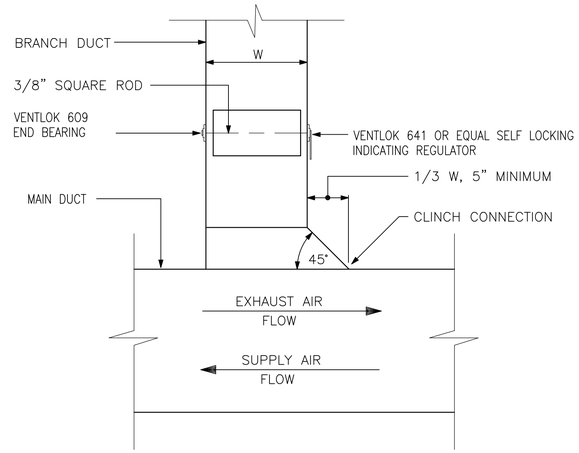


1 HOT WATER PIPING SUPPORT HANGER DETAIL
NO SCALE

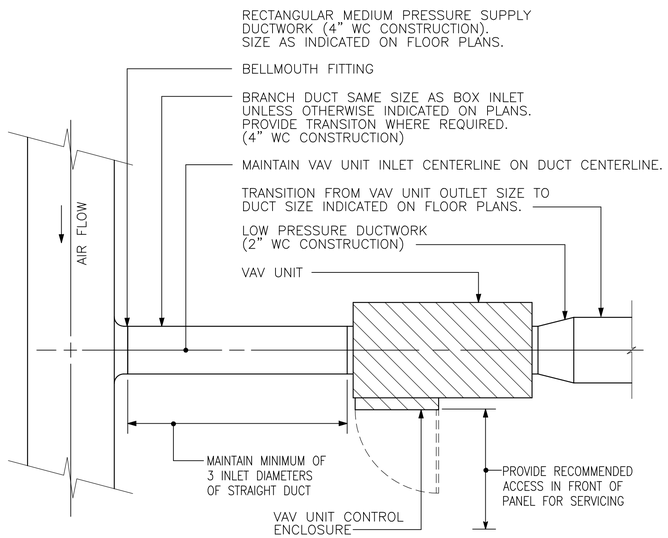


NOTE:
1. VALVES AND ACCESSORIES SHOWN IN PLAN ARE FOR CLARITY. INSTALL IN POSITION SHOWN IN SECTION.
2. FOR PIPE SIZES RE: FLOOR PLANS.
3. FOR PIPE CONSTRUCTION RE: LINE SYMBOL ON FLOOR PLANS.
4. PROVIDE MANUAL AIR VENTS AT HIGH POINTS AND DRAINS AT LOW POINTS OF COIL PIPING.

2 VAV UNIT COIL CONNECTION WITH 3-WAY VALVE DETAIL
NO SCALE

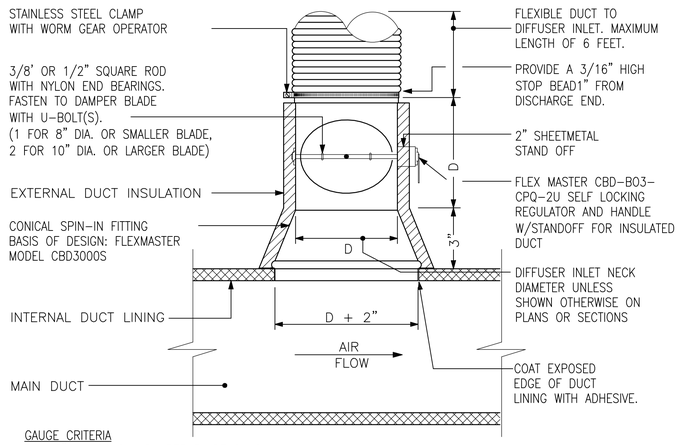


3 RECTANGULAR SUPPLY DUCT TAP DETAIL
NO SCALE



NOTES:
1. COORDINATE EXACT LOCATION OF VAV UNIT CONTROL ENCLOSURES WITH OTHER TRADES. REFER TO FLOOR PLANS AND REVISE PLAN DRAWING LOCATIONS AS NECESSARY TO AVOID CONFLICTS.

4 VAV UNIT CONNECTION DETAIL
NO SCALE



GAUGE CRITERIA
D = 6" – 24 GA., DAMPER BLADE 24 GA.
D = 8" – 22 GA., DAMPER BLADE 22 GA.
D = 10" AND GREATER – – 20 GA., DAMPER BLADE 18 GA.

NOTES:
1. USE THIS DETAIL FOR INTERNALLY LINED DUCTWORK.
2. EXTEND ROUND SHEETMETAL DUCTWORK AND ASSOCIATED DUCT INSULATION FROM MAIN DUCT, SO FLEXIBLE DUCT LENGTH DOES NOT EXCEED 6 FEET.

5 ROUND BRANCH DUCT TO DIFFUSER DETAIL
NO SCALE

Revisions	Date
Project No.	

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Approved: Chief, Engineer	Approved: Safety Manager				Scale: 1/8"=1'-0"	
	Approved: Environment of Care Manager	Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ	Drawn By: DS
	Approved: Facilities Service Line Manager	Building No.: -	AutoCAD File Name: 671-11-712 M-501.DWG	Location: SAN ANTONIO, TEXAS	Drawing No.: M-501	

Veterans Administration

INSULATION SCHEDULE

MECHANICAL SYSTEMS TO BE INSULATED	TEMPERATURE RANGE (F)	PIPE OR DUCT SIZE	INSULATION MATERIAL	INSULATION FORM	INSULATION THICKNESS (INCHES)	R-VALUE (BTU/HR-SF-F)	VAPOR BARRIER REQUIRED	REMARKS
PIPING SYSTEM								
DOMESTIC COLD WATER	ALL	ALL	FIBERGLASS	PIPE	0.5	2.1	YES	1,2
DOMESTIC HOT WATER	ALL	1/2" TO 1"	FIBERGLASS	PIPE	0.5	2.1	NO	1,2
DOMESTIC HOT WATER	ALL	1 1/4" TO 3"	FIBERGLASS	PIPE	0.75	3.2	NO	1,2
HORIZONTAL ROOF DRAIN LEADERS	ALL	ALL	FIBERGLASS	PIPE	0.5	2.1	YES	1,2
HEATING WATER	101-200	1/2" TO 1"	FIBERGLASS	PIPE	1	4.2	NO	1,2,,6
HEATING WATER	101-200	1 1/4" TO 3"	FIBERGLASS	PIPE	1.5	6.3	NO	1,2,,6
CHILLED WATER	35-100	1/2" TO 1 1/2"	FIBERGLASS	PIPE	1.5	6.3	YES	1,2,,6
CHILLED WATER	35-100	2" TO 6"	FIBERGLASS	PIPE	2	8.4	YES	1,2,,6
DUCT SYSTEM								
CONCEALED SUPPLY AIR DUCTWORK ABOVE CEILING AT ROOF LEVEL	ALL	ALL	FIBERGLASS	BLANKET WITH FSK	2	8.4	NO	1,3,,5
CONCEALED SUPPLY AIR DUCTWORK ABOVE CEILINGS OTHER THAN ROOF LEVEL	ALL	ALL	FIBERGLASS	BLANKET WITH FSK	1.5	6.3	NO	1,3,5
CONCEALED RETURN AIR DUCT	ALL	ALL	FIBERGLASS	BLANKET WITH FSK	1.5	6.3	NO	1,3,5
VISIBLE SUPPLY AND RETURN AIR IN OCCUPIED SPACES	ALL	ALL	FIBERGLASS	BLANKET WITH FSK	1	6.3	NO	3,,4

AIR DEVICE SCHEDULE (SUPPLY)

MARK	TYPE	AIR FLOW MIN CFM	AIR FLOW MIN L/s	AIR FLOW MAX CFM	AIR FLOW MAX L/s	MAX APD IN WG	MAX APD [Pa]	MOUNTING	PANEL/FRAME SIZE in x in	PANEL/FRAME SIZE [mm x mm]	NECK SIZE in	NECK SIZE [mm x mm]	NC	DAMPER	FINISH	BASIS OF DESIGN	REMARKS
CD-1	SQ. CLG. DIFFUSER	AS NOTED ON DWG	AS NOTED ON DWG	AS NOTED ON DWG	AS NOTED ON DWG	0.05	[12]	CLG. MOUNT SEE PLANS	24x24	600X600	AS NOTED ON DWG	AS NOTED ON DWG	20	NONE	WHITE	TITUS, MODEL TMS	1
CD-2	SQ. CLG. DIFFUSER	AS NOTED ON DWG	AS NOTED ON DWG	AS NOTED ON DWG	AS NOTED ON DWG	0.1	[24]	CLG. MOUNT SEE PLANS	24x48	600X1200	10"	250	20	YES	WHITE	TITUS, MODEL TRITEC	2

1. THROW PATTERN IS 4 WAY UNLESS NOTED ON DRAWINGS, SPIN-IN FITTINGS TO BE BELL-MOUTH W/ INTEGRAL DAMPER
2. 2-WAY PATTERN

AIR DEVICE SCHEDULE (RETURN)

MARK	TYPE	AIR FLOW MIN CFM	AIR FLOW MIN L/s	AIR FLOW MAX CFM	AIR FLOW MAX L/s	MAX APD IN WG	MAX APD [Pa]	MOUNTING	PANEL/FRAME SIZE in x in	PANEL/FRAME SIZE [mm x mm]	NECK SIZE in x in	NECK SIZE [mm x mm]	NC	DAMPER	FINISH	BASIS OF DESIGN	AIR RETURN TO EQUIPMENT	REMARKS
RG-1	RETURN GRILLE	800	380	1800	850	0.05	12	CEILING	24X24 24X12	600X600 600X300	22x22 22x12	550X550 550X275	20	NONE	WHITE	TITUS, MODEL 50F	AHU-1	

EXISTING AIR HANDLING UNIT SCHEDULE

CODE	SUGGESTED MFR. or APPROVED EQUAL	SYSTEM TYPE	SUPPLY FAN TYPE	SUPPLY FAN SERVICE	SUPPLY FAN ACFM	SUPPLY FAN OA CFM	SUPPLY FAN O.V.	SUPPLY FAN DIA	SUPPLY FAN E.S.P.	SUPPLY FAN RPM	SUPPLY FAN HP	SUPPLY FAN VOLT.	WATER COILS SERVICE	T. MBH	S. MBH	GPM	E.A.T. db.wb.	L.A.T. db.wb.	A.P.D.	ROWS	F.P.I.	FILTERS % EFF
AC2-2B	Mc QUAY	CV	AF	SUPPLY	15,655	3,440			3.25	2413	25	480/3	COOLING			136.8	82.6 / 87.0	54.8 / 53.9	.81	6	10	30

REBALANCED AIR HANDLING UNIT SCHEDULE

CODE	SUGGESTED MFR. or APPROVED EQUAL	SYSTEM TYPE	SUPPLY FAN TYPE	SUPPLY FAN SERVICE	SUPPLY FAN ACFM	SUPPLY FAN OA CFM	SUPPLY FAN O.V.	SUPPLY FAN DIA	SUPPLY FAN E.S.P.	SUPPLY FAN RPM	SUPPLY FAN HP	SUPPLY FAN VOLT.	WATER COILS SERVICE	T. MBH	S. MBH	GPM	E.A.T. db.wb.	L.A.T. db.wb.	A.P.D.	ROWS	F.P.I.	FILTERS % EFF
AC2-2B	Mc QUAY	VAV	AF	NUCLEAR MEDICINE	14345	1815			3.25	2413	25	480/3	COOLING			136.8	82.6 / 87.0	54.8 / 53.9	.81	6	10	30

1. EXISTING AIR HANDLER TO BE REUSED AND RE-BALANCED FOR VAV OPERATION PER SCHEDULE.

VAV TERMINAL BOX UNIT SCHEDULE

CODE	SUGGESTED MFR. or APPROVED EQUAL	SERVICE	ACFM	MIN. CFM	MIN. SP INLET	INLET SIZE	HOT WATER IN	HOT WATER OUT	GPM	MBH	OUTLET SIZE	REMARKS
VAV-1	TITUS DESV	RM 201	1600	660	1.0"	16"	150	110	1	20	18"x24"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-2	TITUS DESV	RM 202	1000	1000	1.0"	12"	150	110	1	21	15"X16"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-3	TITUS DESV	RM 203	900	900	1.0"	10"	150	110	1	17	12"X14"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-4	TITUS DESV	RM 204	1600	660	1.0"	16"	150	110	1	20	18"X24"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-5	TITUS DESV	RM 201A	125	60	1.0"	4"	150	110	1	6.5	10"x12"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-6	TITUS DESV	RM 215	900	900	1.0"	10"	150	110	1	17	12"x14"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-7	TITUS DESV	EX. COVERAGE AREA	1305	450	1.0"	12"	150	110	1	15	15"X16"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-8	TITUS DESV	EX. COVERAGE AREA	585	200	1.0"	8"	150	110	1	7.8	10"X12"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-9	TITUS DESV	EX. COVERAGE AREA	1530	600	1.0"	14"	150	110	1	19	17"X20"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-10	TITUS DESV	EX. COVERAGE AREA	1420	450	1.0"	12"	150	110	1	15	15"X16"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-11	TITUS DESV	EX. COVERAGE AREA	910	300	1.0"	10"	150	110	1	11	12"X14"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-12	TITUS DESV	208 - 218	835	300	1.0"	10"	150	110	1	11	12"X14"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-13	TITUS DESV	230 - 235	920	920	1.0"	10"	150	110	1	17	12"X14"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS
VAV-14	TITUS DESV	200, 205, 206	450	300	1.0"	8"	150	110	1	7.8	10"x12"	PROVIDE FIBER FREE LINING, DIGITAL CONTROLS

REMARKS

1. INSULATION SHALL HAVE AN ALL SERVICE JACKET.
2. PIPE FITTING INSULATION SHALL BE MITERED AND SEALED WITH MASTIC OR COVERED WITH PVC FITTING COVERS.
3. DUCTWORK EXPOSED TO VIEW IN OCCUPIED SPACES SHALL BE GALVANIZED OUT SHELL AND NON-PERFORATED, GALVANIZED, INNER LINING WITH ONE INCH (25MM) THICK GLASS FIBER INSULATION BETWEEN THE TWO WALLS
4. DUCTWORK SHALL BE SEALED IN ACCORDANCE WITH THE SPECIFICATIONS AND THE 2006 EDITION OF THE INTERNATIONAL ENERGY CONSERVATION CODE, SECTION 803.2.8
5. INSULATION SHALL HAVE A 3" OVERLAP AT THE PERIMETER AND AT SEAMS
6. FIELD INSTALL 0.016" THICK ALUMINUM JACKET ON EXTERIOR PIPING. SEAL ALL JOINTS WATER AND VAPOR TIGHT.

Revisions | Date

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01/04/2013

Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor	Drawing Title: MECHANICAL SCHEDULES	Project Title: NUCLEAR MEDICINE RELOCATION	Date: 01/04/2013	
Approved: Chief, Engineer	Approved: Safety Manager			Scale: AS SHOWN	
	Approved: Environment of Care Manager	Project No.: 671-11-712 / Contract No.: VA257-P-0249	Designed By: DS / Checked By: MZ / Drawn By: DS	Drawing No.: M-601	
	Approved: Facilities Service Line Manager	Building No.: - / AutoCAD File Name: 671-11-712 M-601.DWG	Location: SAN ANTONIO, TEXAS		Veterans Administration

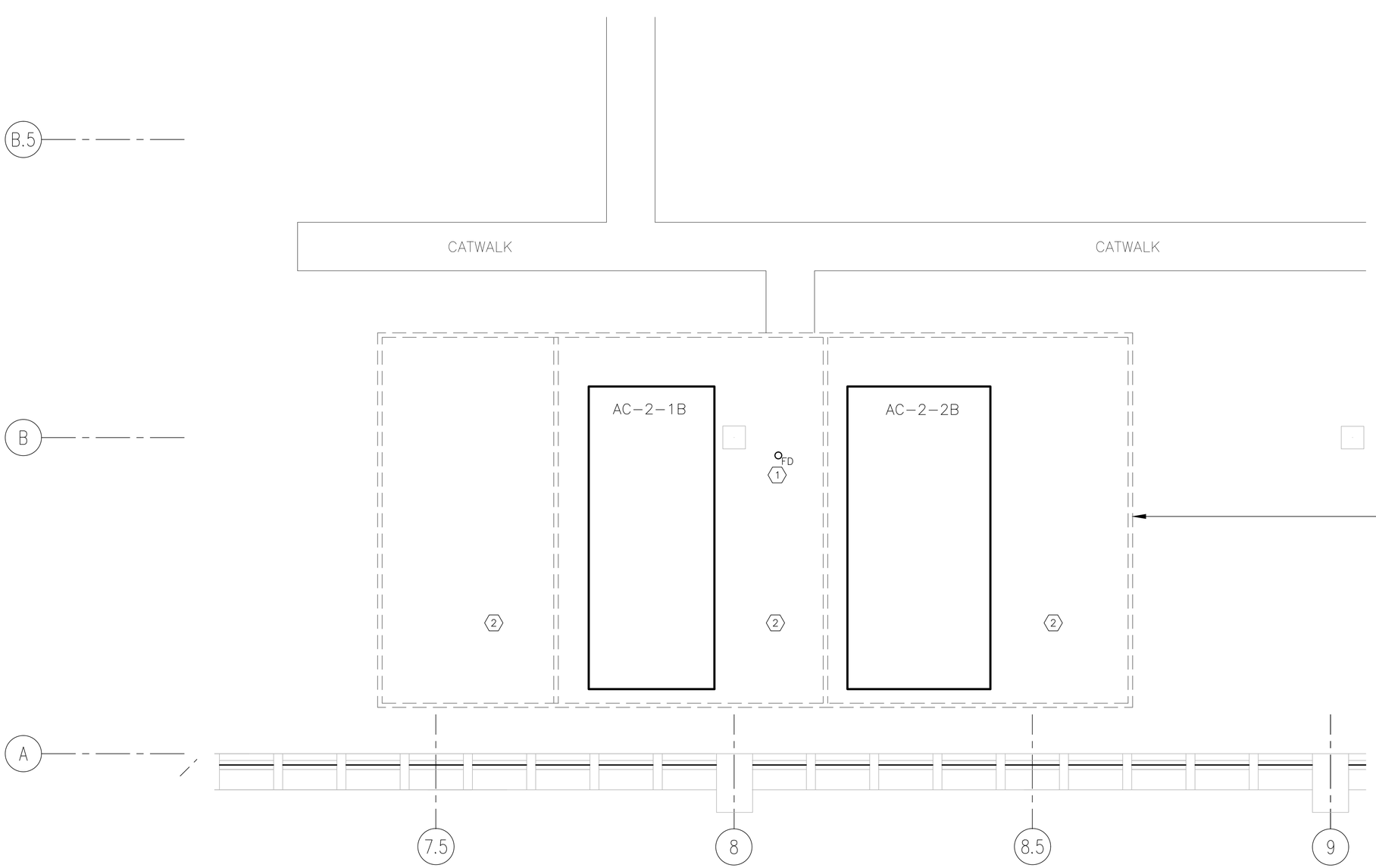
GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE VA PROJECT MANAGER PRIOR TO START OF WORK.
2. SEE SECOND LEVEL PHASING PLAN A–100.
3. IF ADD ALTERNATE NO. 1 IS ACCEPTED, TO BE COMPLETED IN PHASE 1.

KEY NOTES:

(1) IN THE MECHANICAL ROOM IN THE INTERSTITIAL SPACE ABOVE THE SECOND FLOOR PET SCAN ROOM, ADD DEBRIS SCREENS IN ALL FLOOR DRAINS. ENSURE DRAIN PIPING IS CLEAR OF ANY DEBRIS. SNAKE DRAIN PIPE.

(2) IN THE MECHANICAL ROOM IN THE INTERSTITIAL SPACE ABOVE THE SECOND FLOOR PET SCAN ROOM, ADD MOISTURE LEVEL SENSORS. SENSORS TO SEND ALARM TO DDC AND FULLY SHUT DOWN AC–2–1B AND AC–2–2B IN THE EVENT THAT WATER LEVELS RISE ABOVE 2". ONE SENSOR REQUIRED FOR EACH BAY. (3 REQUIRED). ALARM ON FRONT END.

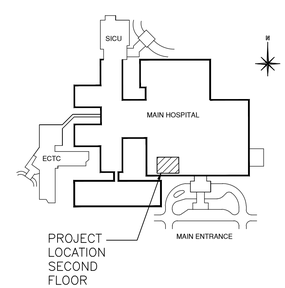


APPROX LOCATION OF EXISTING MECHANICAL ROOM FLOOR LIMIT IN INTERSTITIAL SPACE

SECOND LEVEL INTERSTITIAL MECHANICAL ROOM PLAN ADDITIVE ALTERNATE NO. 1

2 SCALE: 1/4"=1'–0"

NORTH



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6/5/2013

Revisions	Date
Project No.	

Approved: Chief, Maintenance and Operations	Approved: Utility Management Supervisor
Approved: Chief, Engineer	Approved: Safety Manager
	Approved: Environment of Care Manager
	Approved: Facilities Service Line Manager

Drawing Title: SECOND LEVEL INTERSTITIAL MECHANICAL ROOM PLAN ADD. ALT. NO. 1		Project Title: NUCLEAR MEDICINE RELOCATION	
Project No.: 671-11-712	Contract No.: VA257-P-0249	Designed By: DS	Checked By: MZ / Drawn By: DS
Building No.: –	AutoCAD File Name: 671-11-712 MAA1-102.DWG	Location: SAN ANTONIO, TEXAS	Drawing No.: MAA1-101

Date: 01/04/2013
Scale: 1/8"=1'-0"

Veterans Administration