GENERAL MECHANICAL SYMBOLS

- REVISION NUMBER - SHOWN ON PLANS
- POINT WHERE NEW CONNECTS TO EXISTING
- NUMBER OF DETAIL ON SHEET / NUMBER OF SHEET WHERE DETAIL APPEARS
- KEYNOTE
- CONTINUATION SYMBOL
- ROOM NAME AND NUMBER (Room / 1)
- ITEM TO BE DEMOLISHED
- AREA NOT IN CONTRACT
- 2" — PIPE SIZE TAG (DIAMETER)
- ABOVE GROUND PIPING
- 1/8" / 12" SLOPE — PIPE SLOPE TAG
- BELOW GROUND PIPING
- INVERT: -10' - 1" — PIPE INVERT ELEVATION TAG
- (E) — EXISTING PIPE TAG
- PIPING BEING DEMOLISHED

ABBREVIATIONS

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MUA	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FD	FIRE DAMPER	RH	RELATIVE HUMIDITY
FDV	FIRE DEPARTMENT VALVE	RL/A	RELIEF AIR
FL	FLOOR	RM	ROOM
FO	FUEL OIL	RPM	REVOLUTIONS PER MINUTE
FOV	FUEL OIL VENT	RW	RAIN WATER
FOR	FUEL OIL RETURN	SF	SQUARE FOOT
FOS	FUEL OIL SUPPLY	S/A	SUPPLY AIR
FPM	FEET PER MINUTE	SAN	SANITARY
FS	FLOOR SINK	SF	SQUARE FOOT
FT	FOOT/FEET	SD	SMOKE DAMPER
FTR	FIN TUBE RADIATION	SM	SURFACE MOUNT
GAL	GALLON	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

PLUMBING AND PIPING SYMBOLS

CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CD	CONDENSATE DRAINAGE
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
G	NATURAL GAS
PG	PROPANE GAS
REF-L	REFRIGERANT-LIQUID
REF-S	REFRIGERANT-SUCTION
REF-HG	REFRIGERANT-HOT GAS
STM	STEAM
CDR	CONDENSATE RETURN
CWV	COMBINATION WASTE & VENT
CA	COMPRESSED AIR
CW	DOMESTIC COLD WATER
H-CW	HARD COLD WATER
S-CW	SOFT COLD WATER
F-CW	FILTERED COLD WATER
RO	REVERSE OSMOSIS WATER
HW	HOT WATER
HW 140°	HOT WATER 140°
HW-R	HOT WATER RECIRCULATION
HW-R 140°	HOT WATER RECIRCULATION 140°
GV	GREASE VENT
GW	GREASE WASTE
IW	INDIRECT WASTE
OV	OIL VENT
OW	OIL WASTE
PD	PUMP DISCHARGE
V	SANITARY VENT
SS	SANITARY SEWER
SHWR	SOLAR HOT WATER RETURN
SHWS	SOLAR HOT WATER SUPPLY
SD	STORM DRAINAGE
OSD	OVERFLOW STORM DRAINAGE

PIPE DROP, PIPE RISE, PIPE TEE, CAP, 4", 2", PLUG, REDUCING 45 DEGREE TEE, 45 DEGREE TEE, 4"

PIPE ACCESSORY TAGS

- 2" DOM. WM — DOMESTIC WATER METER
- 2" BALANCING — BALANCING VALVE
- 2" SHUTOFF — 1/4 TURN BALL VALVE
- 2" CHECK — CHECK VALVE
- 2" TMV — 3-WAY MIXING VALVE
- 2" M-CNTRL — MOTORIZED CONTROL VALVE
- 2" 3-WAY CNTRL — 3 WAY MOTORIZED CONTROL VALVE
- 2" PRV — PRESSURE REDUCING VALVE
- 3/8" SOLENOID — REFRIGERANT SOLENOID VALVE
- 2" BUTTERFLY — BUTTERFLY VALVE

DRAIN TAGS

FLOOR DRAIN	4" FD-1	TYPE (SEE SCHEDULE)	4" AD-6 — AREA DRAIN
FLOOR DRAIN	4" FD-3P	"P" - INDICATES PRIMER CONNECTION	4" SD-29 — DECK DRAIN
FLOOR SINK	4" FS-4		4" SD-12 — FLOW CONTROL DRAIN
HUB DRAIN	4" FD-13	8 WFU — FIXTURE UNITS	4" SD-15 — STORM DRAIN
		ROOF AREA SERVED BY DRAIN — 4000 SF	6" SD-1 — COMBINATION DRAINS

EQUIPMENT ABBREVIATIONS

AC	AIR CONDITIONING UNIT	EWH	ELECTRIC WATER HEATER
ACC	AIR COOLED CONDENSER	FCU	FAN COIL UNIT
ACCU	AIR COOLING CONDENSING UNIT	FP	FIRE PUMP
AHU	AIR HANDLING UNIT	GI	GREASE INTERCEPTOR
AS	AIR SEPARATOR	GRV	GRAVITY ROOF VENTILATOR
B	BOILER	HWP	HEATING WATER PUMP
CH	CHILLER	HX	HEAT EXCHANGER
CT	COOLING TOWER	HRU	HEAT RECOVERY UNIT
CUH	CABINET UNIT HEATER	PRV	POWER ROOF VENTILATOR
CWP	CONDENSER WATER PUMP	RE	RETURN/EXHAUST FAN
CHWP	CHILLED WATER PUMP	RTU	ROOFTOP UNIT
DBP	DOMESTIC WATER BOOSTER PUMP	SEP	SEWAGE EJECTOR PUMP
DC	DUCT MOUNTED COIL	SF	SUPPLY FAN
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER
ET	EXPANSION TANK		

HVAC SYMBOLS

- 16"x8" — SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
- 16"Ø8" — OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
- 16"Ø — ROUND DUCT SIZE TAG (DIAMETER)
- (E) — EXISTING DUCT TAG
- DUCT BEING DEMOLISHED
- S/A — SUPPLY AIR
- S-O/A — CONDITIONED OUTSIDE AIR
- O/A — OUTSIDE AIR
- R/A — RETURN AIR
- T/A — TRANSFER AIR
- E/A — EXHAUST AIR
- L/A — RELIEF AIR
- GE/A — GREASE EXHAUST AIR
- SE/A — SMOKE EXHAUST AIR
- FLUE — EXHAUST GAS FLUE
- C/A — COMBUSTION AIR
- DROP — RECTANGULAR SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — ROUND SUPPLY/OUTSIDE AIR DUCT RISE
- DROP — RECTANGULAR RETURN/TRANSFER AIR DUCT RISE
- DROP — ROUND RETURN/TRANSFER AIR DUCT RISE
- DROP — RECTANGULAR EXHAUST/RELIEF AIR DUCT RISE
- DROP — ROUND EXHAUST/RELIEF AIR DUCT RISE

GRILLES, REGISTERS & DIFFUSERS TAG

IDENTITY (SEE SCHEDULE) — S-1 | 150 | 24"x24" | 24"x24" — CFM, NECK SIZE / MODULE SIZE; 2 — QUANTITY

MECHANICAL EQUIPMENT TAGS

- VAV-XX — VAV BOX
- VAV-XX — EXISTING EQUIPMENT TO REMAIN
- RTU-XX — ROOFTOP UNIT
- VAV-XX — EQUIPMENT BY OTHERS (REFER TO OTHER DISCIPLINE FOR ADDITIONAL INFORMATION)

DATA DEVICE TAGS (SYMBOL / EQUIPMENT ID)

CARBON DIOXIDE SENSOR	CO2+TH	RTU-XX	TEMPERATURE & HUMIDITY SENSOR
CARBON MONOXIDE SENSOR	CO+TS	VAV-XX	TEMPERATURE SENSOR
NITROGEN DIOXIDE SENSOR	NO2+T		THERMOSTAT
HUMIDITY SENSOR	HS+MS		MANUAL SWITCH
HUMIDISTAT	H+S		SENSOR

DAMPER TAGS

FIRE DAMPER	F	B	MANUAL BALANCING DAMPER
SMOKE DAMPER	S	D	BACKDRAFT DAMPER
MOTORIZED DAMPER	M	C	COMBINATION FIRE/SMOKE DAMPER

HVAC GENERAL CONTRUCTION NOTES

1. THE HVAC CONTRACTOR SHALL BE FAMILIAR WITH ALL CONTRACT DOCUMENTS FOR ALL TRADES AND COORDINATE WITH OTHER CONTRACTORS.
2. THE DRAWINGS ARE DIAGRAMMATIC ONLY; FINAL ROUTING OF DUCTWORK, PIPING AND EQUIPMENT LOCATIONS SHALL BE DETERMINED IN THE FIELD. PROVIDE ALL ADDITIONAL OFFSETS, ELBOWS, ETC., AT NO ADDITIONAL COST TO THE OWNER.
3. CONSTRUCT AND INSTALL ALL DUCTWORK IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA STANDARDS.
4. PROVIDE VOLUME DAMPERS AT ALL LOW PRESSURE SUPPLY, RETURN AND EXHAUST DUCTWORK BRANCH TAKE-OFFS.
5. MINIMUM SIZE OF HOT WATER SUPPLY, HOT WATER RETURN AND CONDENSATE DRAIN PIPING SHALL BE 3/4" UNLESS OTHERWISE NOTED.
6. COORDINATE ALL ELECTRICAL AND PLUMBING REQUIREMENTS WITH THE ELECTRICAL AND PLUMBING CONTRACTORS.
7. COORDINATE THERMOSTAT LOCATIONS WITH THE ARCHITECTURAL FURNITURE PLANS. INSTALL ALL SENSORS AND FINISHED SPACE CONTROLS INCLUDING THERMOSTATS 54" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.
8. PROVIDE ALL INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE HVAC WORK COMPLETE AND READY FOR OPERATION.
9. PROVIDE (FURNISH AND INSTALL) ALL HVAC WORK SHALL BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES.
10. INSTALL ALL HVAC EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
11. DEMOLITION WORK SHALL BE DONE BY THE HVAC CONTRACTOR. THE HVAC CONTRACTOR SHALL COORDINATE ALL WORK CONCERNING EXISTING EQUIPMENT AND SYSTEMS REMAINING IN THE BUILDING.
12. THE HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE INTEGRITY, CONDITION AND LOCATION OF EXISTING DUCTWORK AND PIPING WHICH IS TO BE REUSED. IF PIPING AND DUCTWORK CANNOT BE REUSED, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER TO DETERMINE THE EXTENT OF REPLACEMENT.
13. PROVIDE SHUTOFF VALVES IN THE SUPPLY AND RETURN PIPING TO ALL EQUIPMENT TO ALLOW FOR SERVICING. UNIONS OR FLANGES SHALL BE ARRANGED SUCH THAT EQUIPMENT CAN BE SERVICED WITHOUT CUTTING AND MINIMAL DISRUPTION OF PIPING SERVING THE EQUIPMENT.
14. FURNISH TO THE GENERAL CONTRACTOR ALL INFORMATION REQUIRED FOR SETTING OF WALL, ROOF AND PARTITION OPENINGS FOR HVAC WORK. THIS INFORMATION SHALL BE FURNISHED IN A TIMELY MANNER SUCH THAT CONSTRUCTION SCHEDULE IS NOT JEOPARDIZED.
15. INFORM AND COORDINATE WITH THE OWNER ALL NECESSARY INTERRUPTIONS TO EXISTING BUILDING SYSTEMS AND SERVICE THAT MAY AFFECT THE NORMAL OPERATION OF OCCUPIED PORTIONS OF THE BUILDING. THE OWNER SHALL BE INFORMED OF ANY INTERRUPTIONS AT LEAST TWO (2) WEEKS IN ADVANCE.
16. INFORM THE OWNER WELL IN ADVANCE OF ANY WORK TO BE UNDERTAKEN IN OCCUPIED AREAS OF THE BUILDING ASSOCIATED WITH THIS PROJECT. CONFORM TO THE OWNER'S CRITERIA FOR WORK HOURS, ENVIRONMENTAL ISOLATION, AND NOISE LIMITS IN THE PORTIONS OF THE BUILDING WHICH REMAIN OCCUPIED DURING CONSTRUCTION.
17. COORDINATE PHASING REQUIREMENTS FOR THE PROJECT WITH THE GENERAL CONTRACTOR.
18. FIELD MEASURE THE EXACT SIZES AND VERIFY ALL OPENINGS FOR SHAFTS AND LOUVERS PRIOR TO SUBMISSION OF SHOP DRAWINGS AND INSTALLATION.

HVAC GENERAL DEMOLITION NOTES

1. ALL WORK SHALL CONFORM TO THE STATE OF BUILDING CODES AND ALL OTHER APPLICABLE CODES AND REGULATIONS.
2. THE DRAWINGS DEPICT ONLY GENERALLY THE EXISTING CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD OBSERVATIONS AND CONFIRM WALL LOCATIONS, DUCTWORK, PIPING AND OTHER UTILITIES ABOVE EXISTING CEILINGS.
3. ALL CONFLICTS AND ITEMS FOR CLARIFICATIONS SHALL BE BROUGHT TO THE ENGINEER/ARCHITECT'S ATTENTION PRIOR TO WORK IN THE AREA.
4. THE CONTRACTOR IS RESPONSIBLE TO FOLLOW BUILDING MANAGEMENT RULES WITH REGARDS TO TRASH, ELEVATORS, NOISE, SPRINKLERS AND FIRE ALARM.
5. THE CONTRACTOR SHALL MAINTAIN IN OPERATION ALL EXISTING UTILITIES DURING CONSTRUCTION.
6. ITEMS IDENTIFIED TO BE SALVAGED SHALL BE STOCKPILED IN AN AREA FOR REMOVAL BY THE OWNER; ALL OTHER ITEMS TO BE REMOVED SHALL BE DISPOSED OF LEGALLY OFF SITE. ALL ITEMS BEING REMOVED AND NOT REUSED SHALL BE DISPOSED OF AS DIRECTED BY THE OWNER.
7. CAPPING OF ALL SERVICES SHALL BE PERFORMED TO LEAVE EXISTING SERVICES TO OTHER AREAS INTACT AND FUNCTIONAL.
8. ALL DEMOLITION WORK WILL BE SCHEDULED WITH BUILDING MANAGEMENT AND PERFORMED ONLY FOLLOWING APPROVAL.
9. THE CONTRACTOR SHALL INFORM BUILDING MANAGEMENT AND RECEIVE SCHEDULE APPROVAL FOR ANY REQUIRED UTILITY SHUTDOWN.
10. WHERE EQUIPMENT IS SHOWN TO BE REMOVED, THE EQUIPMENT SHALL BE DELIVERED TO BUILDING MANAGEMENT FOR STORAGE OR PROPERLY DISPOSED OF AS DIRECTED BY BUILDING MANAGEMENT.
11. WHERE EQUIPMENT IS SHOWN OR NOTED AS BEING REMOVED & REPLACED AFTER WALL/CEILING STRUCTURAL OR ARCHITECTURAL WORK IS PERFORMED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER, SAFE STORAGE OF SUCH EQUIPMENT.
12. ANY DUCTWORK SHOWN TO BE REMOVED SHALL INCLUDE REMOVE OF ALL ASSOCIATED DUCTWORK, FLEXIBLE CONNECTIONS, DIFFUSERS, HANGERS, INSULATION, ETC.
13. ANY PIPING SHOWN TO BE REMOVED WILL BE REMOVED TO THE POINT INDICATED ON THE DRAWING OR TO THE ACTIVE MAIN AND VALVED AND CAPPED. PIPING REMOVAL SHALL INCLUDE ALL HANGERS, VALVES, INSULATION, ETC.
14. EXISTING DUCTWORK SHALL BE CAPPED AND SEALED AIR TIGHT, EXCEPT WHERE UTILIZED FOR NEW BRANCH DUCTWORK.
15. THERMOSTATS ARE TO BE RELOCATED AS SHOWN ON NEW WORK DRAWING.
16. REMOVE AND CLEAN ALL SUPPLY, RETURN & EXHAUST DIFFUSERS & GRILLES. RE-INSTALL OR SAVE FOR RELOCATION AS SHOWN ON NEW WORK PLAN.
17. ALL DIFFUSERS TO BE TIED TO UNDERSIDE OF STRUCTURE TO FACILITATE REMOVAL OF EXISTING CEILING AND MAINTAIN DIFFUSER CONNECTION TO DUCTWORK WHERE APPLICABLE. DIFFUSERS SHALL BE REPLACED INTO NEW CEILING GRID AS SHOWN ON NEW WORK DRAWING. ADDITIONAL LENGTH OF FLEX MAY BE REQUIRED FOR DIFFUSERS.
18. CONTRACTOR SHOULD SURVEY EXISTING CONDITIONS AND INFORM ENGINEER OF ANY DEVIATIONS PRIOR TO CONSTRUCTION.

* NOTE *
ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET.THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

Project:
Mass DMH
Department of Mental Health
391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson
Weston & Sampson Engineers, Inc.
55 Walters Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

Date: 4/11/2019
Drawn By: MRC
Reviewed By: SES
Approved By: SEH
W&S Project No: 2180884

Drawing Title:
HVAC LEGEND

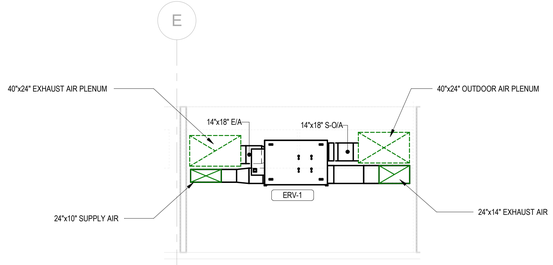
Sheet Number:
H-000

CONSTRUCTION GENERAL NOTES

1. PROVIDE FLEXIBLE DUCT CONNECTOR AT CONNECTION OF OUTDOOR AIR DUCT TO INDOOR HEAT PUMPS.
2. PROVIDE FLEXIBLE DUCT CONNECTOR AT EACH DUCT CONNECTION TO ERV-1.
3. PROVIDE SPRING VIBRATION ISOLATION HANGERS FOR ALL HEAT PUMPS, ERV, AND HEAT RECOVERY BRANCH CONTROLLER. ISOLATORS SHALLL HAVE A MINIMUM OF 0.75".
4. PROVIDE 1" DUCT LINER AS SHOWN ON FLOOR PLANS FOR DUCTED HEAT PUMPS. LINE RETURN AIR PLENUM AND LOW PRESSURE SUPPLY DUCT MAIN. REFER TO SPECIFICATIONS FOR DETAILS ON DUCT LINER.

CONSTRUCTION KEYED NOTES

1. PROVIDE CONCRETE PAVERS UNDER LOUVER AREA TO COVER GROUND IN VICINITY OF AIR INTAKE/DISCHARGE.
2. PROVIDE AND INSTALL REMOTE VOLUME DAMPER OPERATORS FOR RETURN GRILLES. LOCATE REMOTE DAMPER OPERATORS ABOVE CEILING IN PLENUM, NEXT TO RESPECTIVE HEAT PUMP.
3. PROVIDE 6" CONCRETE PAD. EXTEND PAD 6" BEYOND PERIMETER OF ACCU-1. ACCU-1 TO BE INSTALLED WITH EQUIPMENT STAND. REFER TO EQUIPMENT SCHEDULES FOR ADDITIONAL INFORMATION.



2 / H-100 ERV SECTION DETAIL
1/4" = 1'-0"

1 / H-100 BASEMENT DUCTWORK CONSTRUCTION PLAN
1/4" = 1'-0"

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walters Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

PROJECT TRUE

0' 2' 4' 8'
SCALE: 1/4" = 1'-0"

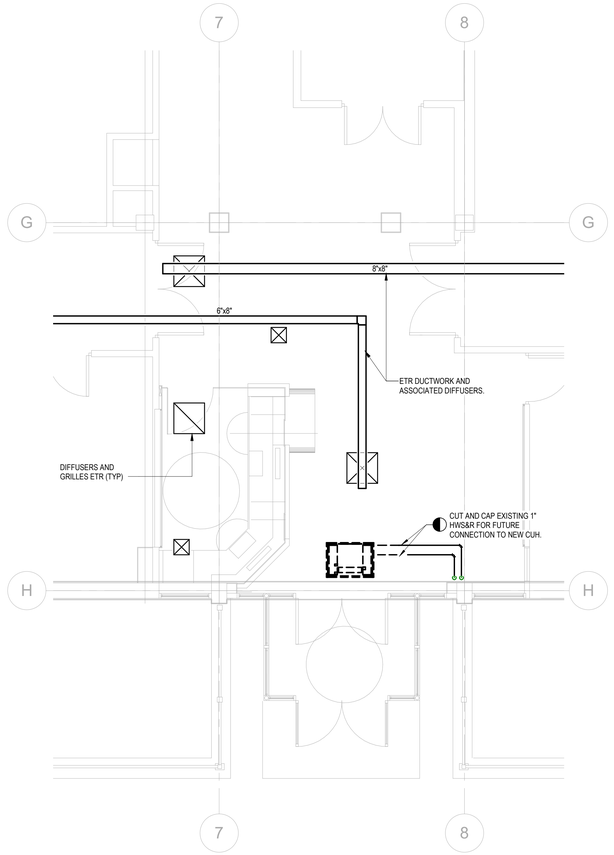
Date: 4/11/2019
Drawn By: MRC
Reviewed By: SES
Approved By: SEH
W&S Project No: 2180884

Drawing Title:

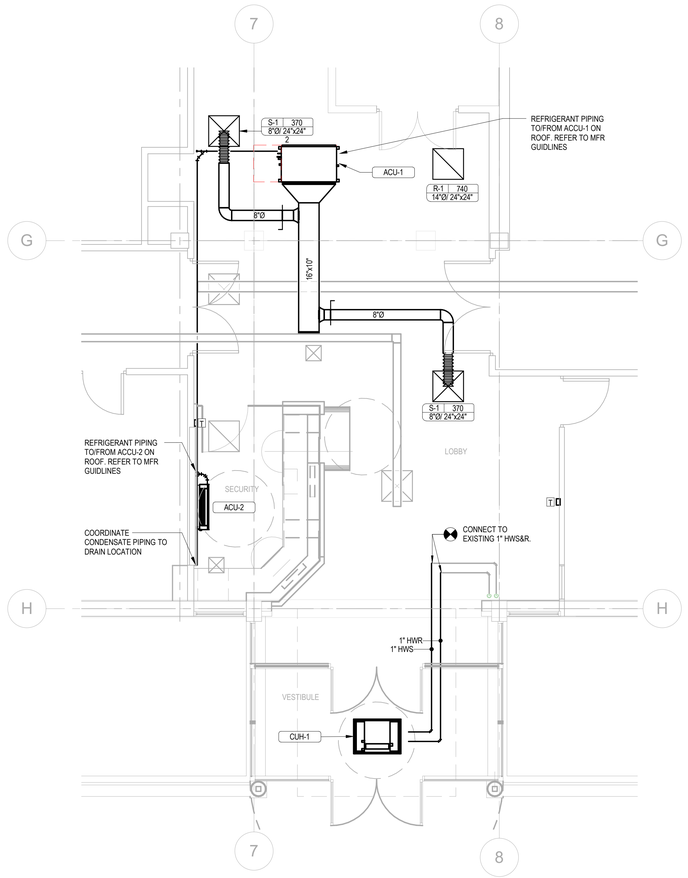
HVAC BASEMENT DUCTWORK PLAN

Sheet Number:

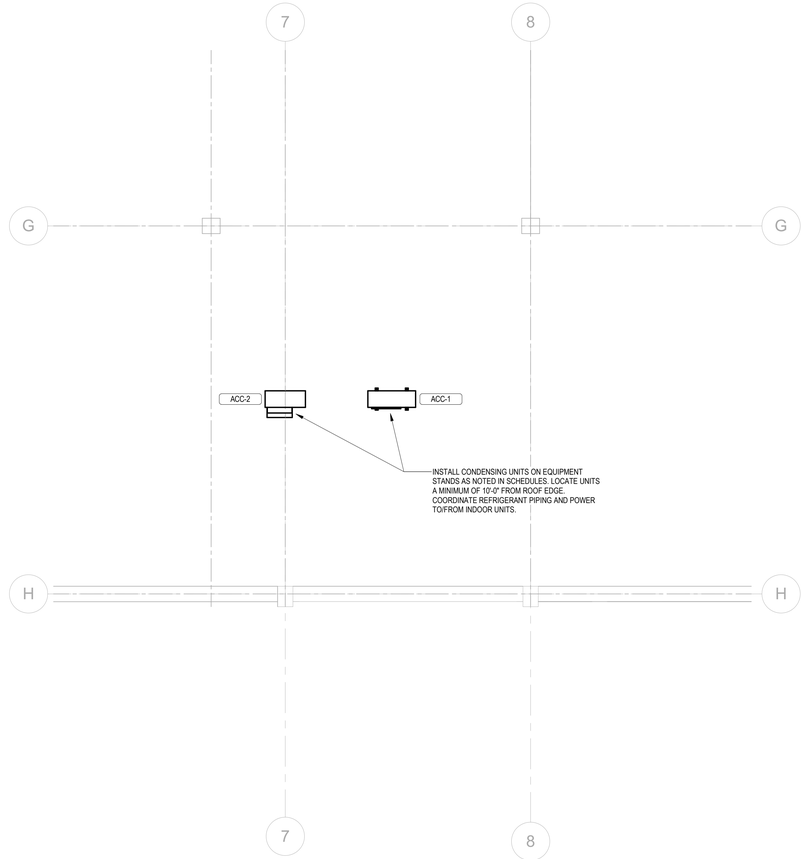
H-100



1 H-101 LOBBY/VESTIBULE DEMOLITION PLAN
1/4" = 1'-0"



2 H-101 LOBBY/VESTIBULE CONSTRUCTION PLAN
1/4" = 1'-0"



3 H-101 ROOF CONSTRUCTION PLAN
1/4" = 1'-0"

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walters Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

PROJECT TRUE

0' 2' 4' 8'
SCALE: 1/4" = 1'-0"

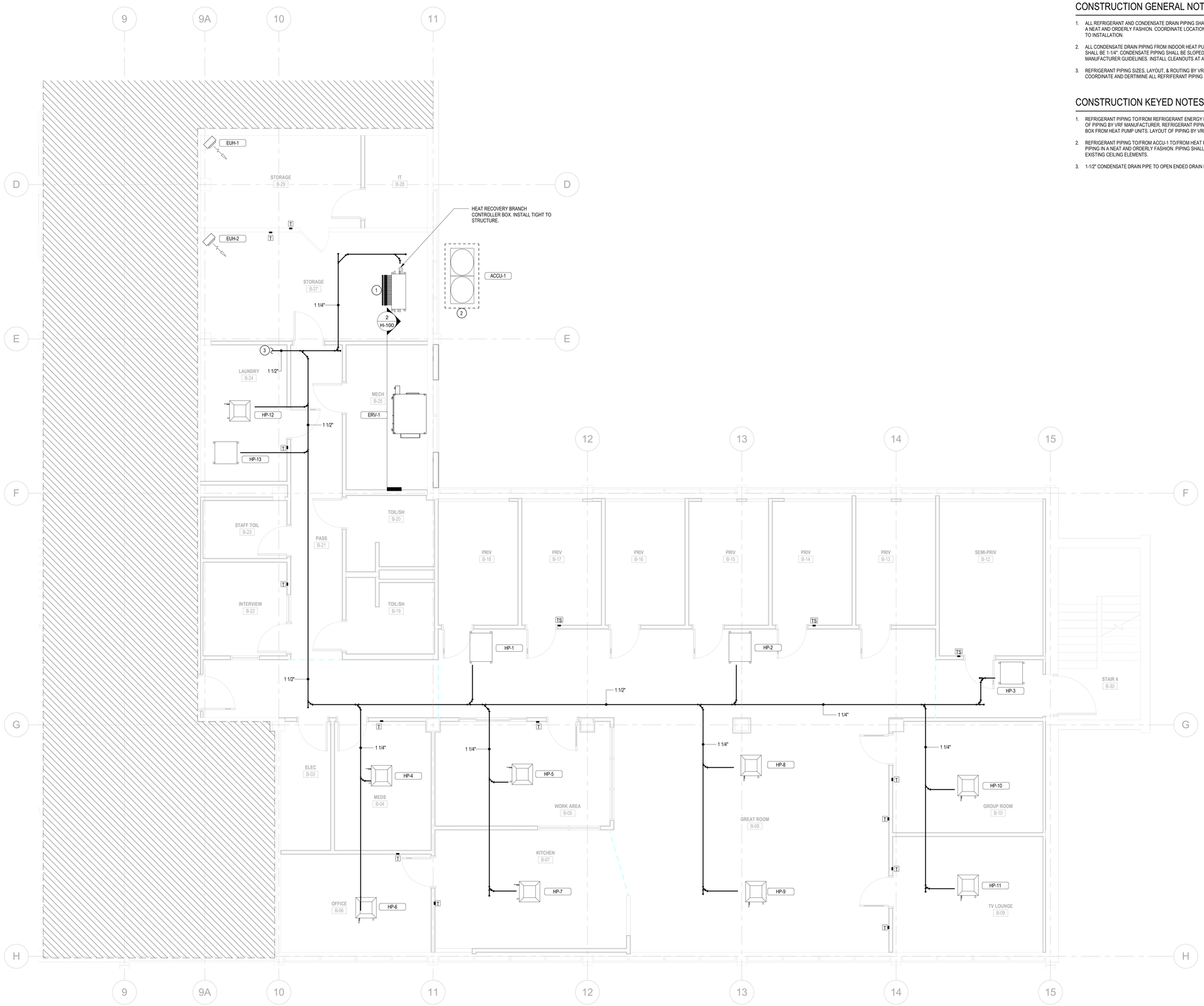
Date: 4/11/2019
Drawn By: MRC
Reviewed By: SES
Approved By: SEH
W&S Project No: 2180884

Drawing Title:

HVAC FIRST FLOOR PLAN

Sheet Number:

H-101



CONSTRUCTION GENERAL NOTES

1. ALL REFRIGERANT AND CONDENSATE DRAIN PIPING SHALL BE INSULATED. PIPING SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION. COORDINATE LOCATION OF PIPING WITH ARCHITECT/ENGINEER PRIOR TO INSTALLATION.
2. ALL CONDENSATE DRAIN PIPING FROM INDOOR HEAT PUMPS AND HEAT RECOVERY BRANCH CONTROLLER SHALL BE 1-1/4". CONDENSATE PIPING SHALL BE SLOPED AT AN ANGLE OF 1/100 - PER VRF MANUFACTURER GUIDELINES. INSTALL CLEANOUTS AT ALL OFFSETS AND ELBOWS.
3. REFRIGERANT PIPING SIZES, LAYOUT, & ROUTING BY VRF MANUFACTURER. MANUFACTURER TO COORDINATE AND DERTIMINE ALL REFRIFERANT PIPING SIZES, LOCATIONS, AND LENGTHS.

CONSTRUCTION KEYED NOTES

1. REFRIGERANT PIPING TO/FROM REFRIGERANT ENERGY RECOVERY BOX FROM HEAT PUMP UNITS. LAYOUT OF PIPING BY VRF MANUFACTURER. REFRIGERANT PIPING TO/FROM REFRIGERANT ENERGY RECOVERY BOX FROM HEAT PUMP UNITS. LAYOUT OF PIPING BY VRF MANUFACTURER.
2. REFRIGERANT PIPING TO/FROM ACCU-1 TO/FROM HEAT RECOVERY BRANCH CONTROLLER BOXES. ROUTE PIPING IN A NEAT AND ORDERLY FASHION. PIPING SHALL BE INSTALLED TIGHT TO EXISING STRUCTURE AND EXISTING CEILING ELEMENTS.
3. 1-1/2" CONDENSATE DRAIN PIPE TO OPEN ENDED DRAIN IN LAUNDRY ROOM.

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

PROJECT TRUE

0' 2' 4' 8'

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

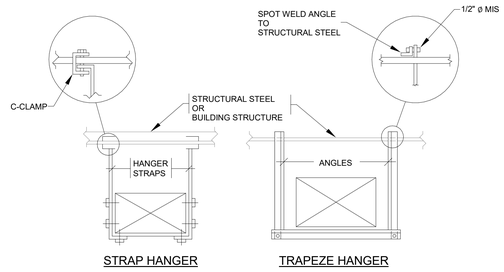
Date:	4/11/2019
Drawn By:	MRC
Reviewed By:	SES
Approved By:	SEH
W&S Project No:	2180884

Drawing Title:

HVAC BASEMENT PIPING PLAN

Sheet Number:

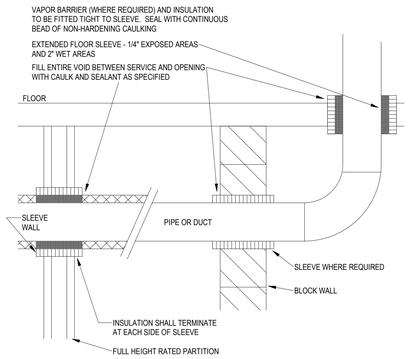
H-201



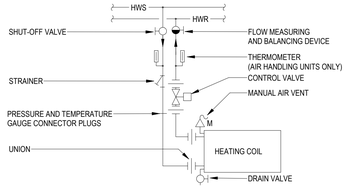
NOTES:

1. FOR STRAP AND TRAPEZE HANGER SIZE, REFER TO SMACNA DUCT STANDARDS
2. NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEET METAL SCREWS ONLY.

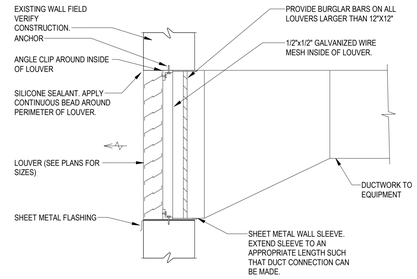
6 H-501 DUCT SUPPORT DETAIL
NOT TO SCALE



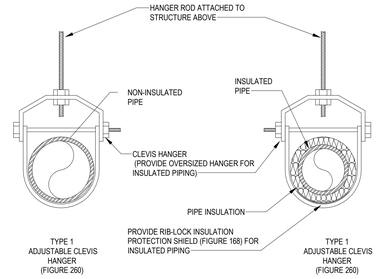
7 H-501 DUCT OR PIPE WALL AND FLOOR PENETRATION DETAIL
NOT TO SCALE



8 H-501 HOT WATER COIL PIPING DETAIL W/2-WAY VALVE - SINGLE
NOT TO SCALE



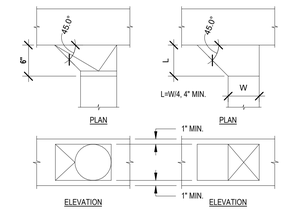
1 H-501 LOUVER ASSEMBLY DETAIL
NOT TO SCALE



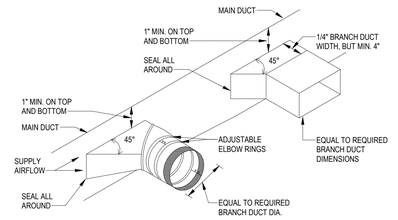
(FIGURE CT-65 FOR COPPER TUBING)

NOTE:
FIGURE NUMBERS ARE TYPICAL TO GRINNELL SUPPORT NUMBERS.

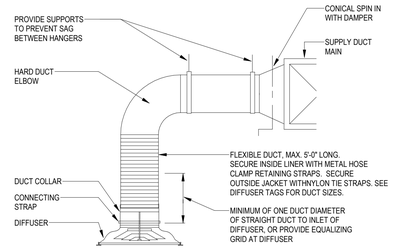
2 H-501 SINGLE PIPE CLEVIS HANGER
NOT TO SCALE



3 H-501 DUCT TAKE-OFF DETAIL
NOT TO SCALE



4 H-501 TYPICAL BRANCH TAKEOFF FITTING DETAIL
NOT TO SCALE



5 H-501 DIFFUSER FLEXIBLE DUCT CONNECTION
NOT TO SCALE

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walters Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

SCALE: AS

Date: 4/11/2019
Drawn By: MRC
Reviewed By: SES
Approved By: SEH
W&S Project No: 2180884

Drawing Title:

HVAC DETAILS

Sheet Number:

H-501

AIR COOLED CONDENSING UNIT SCHEDULE

ID	SERVICE/LOCATION	MANUFACTURER	MODEL NO.	TOTAL COOLING (BTU/H)	TOTAL HEATING (BTU/H)	REFRIGERANT TYPE	IEER	VOLT	PH	HZ	WEIGHT (LB)	REMARKS
ACCU-1	VRF SYSTEM/COURTYARD	MITSUBISHI	PURY-P144TKMU-A	144000	160000	R-410A	20.9	208	3	60 Hz	715	RATED CONDITIONS (INDOOR/OUTDOOR): COOLING - 80°F DB, 67°F WB / 91°F DB; HEATING - 60°F DB / 0°F DB, -1°F WB.

1. PROVIDE HEAT RECOVERY BRANCH CIRCUIT CONTROLLER (CMB-P1016NU-HA1). BRANCH CONTROLLER REQUIRES A POWER CONNECTION - 208/1/60.
2. PROVIDE 24" HEAVY DUTY MOUNTING STAND (QUICK-SLING 24" SUPER STAND - TYPE C MODEL NO. QSSS1005-24").

HEAT PUMP SCHEDULE

ID	LOCATION/SERVICE	MANUFACTURER	MODEL NO.	TYPE	TOTAL COOLING (BTU/H)	TOTAL HEATING (BTU/H)	SUPPLY AIRFLOW (CFM)	OUTDOOR AIRFLOW (CFM)	REFRIGERANT	FILTER	VOLT	PH	HZ	REMARKS
HP-1	PRIVATE ROOMS	MISTUBISHI	PEFY-P15NMAU-E3	CONCEALED DUCTED	15,000	9,900	500	85	R-410A	MERV 13	208	1	60	PROVIDE FILTER BOX (FBM2-2) WITH 2" MERV 13 FILTER.
HP-2	PRIVATE ROOMS	MISTUBISHI	PEFY-P15NMAU-E3	CONCEALED DUCTED	15,000	9,900	500	85	R-410A	MERV 13	208	1	60	PROVIDE FILTER BOX (FBM2-2) WITH 2" MERV 13 FILTER.
HP-3	SEMI -PRIVATE ROOM	MISTUBISHI	PEFY-P06NMAU-E3	CONCEALED DUCTED	6,000	3,900	300	45	R-410A	MERV 13	208	1	60	PROVIDE FILTER BOX (FBM2-2) WITH 2" MERV 13 FILTER.
HP-4	MED STORAGE	MITSUBISHI	PLFY-P05NFMU-E	2X2 CASSETTE	5,000	3,300	280	35	R-410A	WASHABLE	208	1	60	
HP-5	WORK AREA	MITSUBISHI	PLFY-P08NFMU-E	2X2 CASSETTE	8,000	5,300	315	100	R-410A	WASHABLE	208	1	60	
HP-6	OFFICE	MITSUBISHI	PLFY-P12NFMU-E	2X2 CASSETTE	12,000	7,900	335	20	R-410A	WASHABLE	208	1	60	
HP-7	KITCHEN	MITSUBISHI	PLFY-P15NFMU-E	2X2 CASSETTE	15,000	9,900	390	60	R-410A	WASHABLE	208	1	60	
HP-8	GREAT ROOM	MITSUBISHI	PLFY-P18NFMU-E	2X2 CASSETTE	18,000	11,600	460	300	R-410A	WASHABLE	208	1	60	
HP-9	GREAT ROOM	MITSUBISHI	PLFY-P18NFMU-E	2X2 CASSETTE	18,000	11,600	460	300	R-410A	WASHABLE	208	1	60	
HP-10	GROUP ROOM	MITSUBISHI	PLFY-P05NFMU-E	2X2 CASSETTE	5,000	3,300	280	90	R-410A	WASHABLE	208	1	60	
HP-11	TV/LOUNGE	MITSUBISHI	PLFY-P15NFMU-E	2X2 CASSETTE	15,000	9,900	390	100	R-410A	WASHABLE	208	1	60	
HP-12	LAUNDRY	MITSUBISHI	PLFY-P05NFMU-E	2X2 CASSETTE	5,000	3,300	280	30	R-410A	WASHABLE	208	1	60	
HP-13	INTERVIEW/TOILETS	MISTUBISHI	PEFY-P06NMAU-E3	CONCEALED DUCTED	6,000	3,900	300	45	R-410A	MERV 13	208	1	60	PROVIDE FILTER BOX (FBM2-2) WITH 2" MERV 13 FILTER.

1. PROVIDE WIRED SMART ME REMOTE CONTROLLER WITH INTEGRAL OCCUPANCY SENSOR (MITSUBISHI MODEL PAR-U01MEDU-K) FOR EACH INDOOR UNIT. PROVIDE TEMPERATURE SENSOR (PAC-SE41TSE) IN PATIENT ROOMS.
2. PROVIDE BACNET INTERFACE CARD (MITSUBISHI MODEL PAC-UKPRC001-CN-1) FOR EACH INDOOR UNIT.
3. PROVIDE AUXILARY DRAIN PAN SENSOR (MITSUBISHI MODEL DPLS2) TO SHUT DOWN INDOOR UNIT IF WATER IS SENSED. SENSOR POWERED BY INDOOR UNIT CONTROL BOARD.

ENERGY RECOVERY VENTILATOR SCHEDULE

ID	LOCATION/SERVICE	MANUFACTURER	MODEL NO.	OUTDOOR/SUPPLY		EXHAUST/RETURN		ENTHALPY RECOVERY RATIO (%)			FILTER MERV RATING		MCA	MOCP	VOLT	PH	FREQ	WEIGHT (LB)	REMARKS
				OA (CFM)	ESP (IN WG)	EA (CFM)	ESP (IN WG)	COOLING	HEATING	PRE-FILTER	EA FILTER	OA FILTER							
ERV-1	MECH ROOM	RENEWAIRE	HE 2XINH	1300	0.5	1300	0.5	55	65	MERV 8	MERV 13	MERV 13	34.2 A	45.0	120	1	60	714	

1. PROVIDE UNIT WITH OUTDOOR AIR, EXHAUST AIR AND BYPASS AIR CONTROL DAMPERS. ERV SHALL OPERATE WITH TIMED EXHAUST FOR FROST CONTROL.
2. PROVIDE TIME CLOCK TO OPERATE UNIT ONLY DURING SET OCCUPIED HOURS.
3. PROVIDE NETWORK INTERFACE CARD FOR FUTURE BACNET INTEGRATION.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

EQUIPMENT NAME	AIRFLOW RANGE (CFM)	TYPE	INLET SIZE (IN)	FACE SIZE (IN)	MATERIAL	MAX PD (IN WG)	MAX NC	BASIS OF DESIGN		REMARKS
								MANUFACTURER	MODEL	
E-1	0-125	SECURITY GRILLE EXHAUST	12"x12"	14"x14"	STEEL	0.01	<20	TITUS	SG-SD-6	
R-1	0-75	RETURN GRILLE	8"x8"	24"x24"	ALUMINUM	0.01	<20	TITUS	OMNI-AA	
R-2	0-300	SECURITY GRILLE RETURN	12"x12"	14"x14"	STEEL	0.04	<20	TITUS	SG-SD-6	
S-1	0-75	SUPPLY GRILLE	6"Ø	24"x24"	ALUMINUM	0.01	<20	TITUS	OMNI-AA	
S-2	0-300	SECURITY GRILLE SUPPLY	12"x12"	14"x14"	STEEL	0.04	<20	TITUS	SG-SD-6	
T-1	0-1000	EGGCRATE TRANSFER GRILLE	22"x22"	24"x24"	ALUMINUM	0.04	<20	TITUS	45F	

ELECTRIC UNIT HEATER SCHEDULE

ID	MANUFACTURER	MODEL NO.	FAN				TOTAL HEATING POWER (kW)	HEATING CAPACITY (BTU/H)	UNIT WEIGHT (LB)	VOLT	PH	REMARKS
			AIRFLOW (CFM)	DRIVE TYPE	MOTOR							
					QTY	POWER (HP)	RPM						
EUH-1	QMARK	MUH03-81	350	DIRECT	1	0.01	1600	3.0	10,200	27	208	1	
EUH-2	QMARK	MUH03-81	350	DIRECT	1	0.01	1600	3.0	10,200	27	208	1	

1. PROVIDE MANUFACTURER OPTIONAL MOUNTING BRACKET.

LOUVER SCHEDULE

ID	SERVICE	MANUFACTURER	MODEL NO.	QTY	MATERIAL	FINISH	TYPE	AIRFLOW (CFM)	FREE AREA (%)	FREE AREA VELOCITY (FPM)	DIMENSIONS		UNIT WEIGHT (LB)	REMARKS
											WIDTH	HEIGHT		
EA LV	EXHAUST LOUVER ERV	GREENHECK	ESD-403	1	ALUMINUM	CLEAR ANODIZE	FIXED BLADE	1300	46.7	417	40"	24"	23	
OA LV	INTAKE LOUVER ERV	GREENHECK	ESD-403	1	ALUMINUM	CLEAR ANODIZE	FIXED BLADE	1300	46.7	417	40"	24"	23	

EQUIPMENT SERVES BASEMENT

AIR COOLED CONDENSING UNIT SCHEDULE

ID	SERVICE/LOCATION	MANUFACTURER	MODEL NO	TOTAL COOLING (BTU/H)	TOTAL HEATING (BTU/H)	REFRIGERANT TYPE	EER	VOLT	PH	HZ	WEIGHT (LB)	REMARKS
ACC-1	LOBBY/ROOF	MITSUBISHI	PUZ-A12NKA7	12,000	18,000	R-410A	12	208	1	60	93	
ACC-2	SECURITY/ROOF	MITSUBISHI	PUZ-A12NKA7	12,000	18,000	R-410A	12	208	1	60	93	

1. PROVIDE WIND BAFFLE FOR LOW AMBIENT OPERATION. OUTDOOR UNIT PROVIDES POWER TO INDOOR ACC UNIT.
2. PROVIDE 24" HEAVY DUTY MOUNTING STAND (QUICK-SLING 24" MIN-SPLIT STAND - MODEL NO. QSMS-2401).

SPLIT-TYPE AIR CONDITIONER SCHEDULE

ID	LOCATION/SERVICE	MANUFACTURER	MODEL NO.	TYPE	TOTAL COOLING (BTU/H)	TOTAL HEATING (BTU/H)	SUPPLY AIRFLOW (CFM)	REFRIGERANT	FILTER	VOLT	PH	HZ	REMARKS
ACU-1	LOBBY	MITSUBISHI	PEAD-A12AA7	CONCEALED DUCTED	12,000	9,000	740	R-410A	MERV 13	208	1	60	PROVIDE FILTER BOX (FBM2-2) WITH 2" MERV 13 FILTER.
ACU-2	SECURITY	MITSUBISHI	PKA-A12HA7	WALL MOUNTED	3,300	500	140	R-410A	WASHABLE	208	1	60	

1. PROVIDE MINI CONDENSATE PUMP (SUD-230). INDOOR UNIT RECEIVES POWER FROM OUTDOOR CONDENSING UNIT.
2. PROVIDE WIRED SIMPLE MA CONTROLLER (MITSUBISHI MODEL PAC-YT53CRAU).
3. PROVIDE BACNET INTERFACE CARD FOR FUTURE INTEGRATION INTO A BMS (MITSUBISHI MODEL PAC-UKPRC001-CN-1).
4. PROVIDE AUXILARY DRAIN PAN SENSOR (MITSUBISHI MODEL DPLS2) TO SHUT DOWN INDOOR UNIT IF WATER IS SENSED. SENSOR POWERED BY INDOOR UNIT CONTROL BOARD.

CABINET UNIT HEATER SCHEDULE

ID	LOCATION	MANUFACTURER	MODEL NO.	TYPE	FAN		HEATING COIL								REMARKS
					AIRFLOW (CFM)	MOTOR POWER (HP)	TOTAL CAPACITY (BTU/H)	AIRSIDE		WATERSIDE			UNIT WEIGHT (LB)	VOLT	PH	
								EAT(DB) (°F)	LAT(DB) (°F)	FLOW (GPM)	EWT(°F)	LWT(°F)	PD (FT H2O)	TYPE			
CUH-1	VESTIBULE	VULCAN	RC-02	CEILING MOUNTED	230	0.07	16,200	60.0	90.0	2.5	180	168	0.2	WATER	102	120	1	

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

ID	AIRFLOW (CFM)	DESCRIPTION	MANUFACTURER	MODEL	SYSTEM	NECK DIAMETER	N.C.	REMARKS
R-1	0-1200	RETURN GRILLE	TITUS	OMNI-AA	R/A	14"	-	
S-1	0-500	SUPPLY DIFFUSER	TITUS	OMNI-AA	S/A	8"	<30	

EQUIPMENT SERVES LOBBY/VESTIBULE

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walters Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

Date: 4/11/2019

Drawn By: MRC

Reviewed By: SES

Approved By: SEH

W&S Project No: 2180884

Drawing Title:

HVAC SCHEDULES

Sheet Number:

H-601

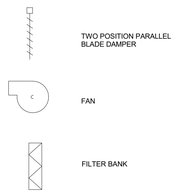
CONTROL POINT DESCRIPTOR LEGEND

TAG	ATC CONTRACTOR PROVIDED DDC POINT AND HARDWARE
TAG ELEC PLBG	CONTROL DEVICE FURNISHED BY ELECTRICAL OR PLUMBING CONTRACTOR BUT INTERFACED TO DDC SYSTEM BY ATC CONTRACTOR
TAG	ATC CONTRACTOR INTERFACE TO EQUIPMENT MANUFACTURER'S HARDWARE
	ATC CONTRACTOR PROVIDED LOCAL CONTROL POINT

CONTROL ABBREVIATIONS

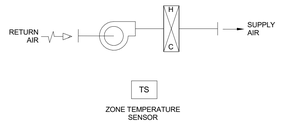
EAD	EXHAUST AIR DAMPER
ES	END SWITCH
OAD	OUTSIDE AIR DAMPER
OC	OCCUPANCY SENSOR
TS	TEMPERATURE SENSOR

CONTROL DIAGRAM SYMBOLS



ATC GENERAL NOTES

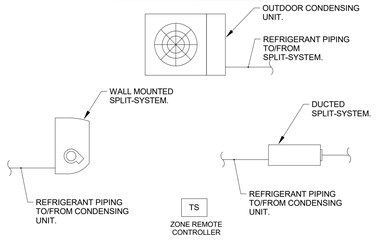
1. PACKAGED MANUFACTURER CONTROLS TO BE PROVIDED WITH ALL EQUIPMENT AS SHOWN IN THE CONTROL DIAGRAMS AND DESCRIBED IN THE SPECIFICATIONS.
2. ALL EXPOSED CONTROL WIRING SHALL BE INSTALLED IN CONDUIT.
3. MECHANICAL CONTRACTOR TO COORDINATE WITH EQUIPMENT MANUFACTURERS TO ENSURE ALL CONTROLS AND SEQUENCES OF OPERATIONS CAN BE ACHIEVED PRIOR TO SUBMITTAL OF SHOP DRAWINGS.
4. ALL EQUIPMENT CONTROLS SHALL BE PROVIDED WITH THE CAPABILITY TO BE INTEGRATED INTO A FUTURE BUILDING MANAGEMENT SYSTEM. COORDINATE WITH DEPARTMENT OF MENTAL HEALTH FACILITIES.



GENERAL

1. THE ELECTRIC UNIT HEATER WILL BE PROVIDED WITH A LINE VOLTAGE SPACE THERMOSTAT FROM THE MANUFACTURER.
2. THE ELECTRIC UNIT HEATER WILL OPERATE TO MAINTAIN A SPACE TEMPERATURE SET POINT OF 60°F (ADJ).

ELECTRIC UNIT HEATER



GENERAL

1. SPLIT-SYSTEM SHALL BE CONTROLLED BY MANUFACTURER'S STAND-ALONE PACKAGED CONTROLS.
2. THE SPLIT-SYSTEMS SHALL OPERATE BASED ON A TIME OF DAY SCHEDULE SETUP IN THE STAND-ALONE CONTROLLER.

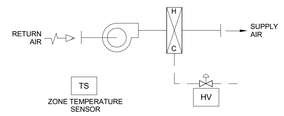
OCCUPIED SEQUENCE

1. WHEN IN OCCUPIED MODE THE SPLIT-SYSTEM SHALL OPERATE TO MAINTAIN THE OCCUPIED TEMPERATURE SET POINT.
2. THE SPLIT-SYSTEM SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN OCCUPIED MODE.

UNOCCUPIED SEQUENCE

1. WHEN IN UNOCCUPIED MODE THE SPLIT-SYSTEM SHALL BE OFF. IF THE SPACE TEMPERATURE GOES ABOVE THE UNOCCUPIED COOLING TEMPERATURE SET POINT OR BELOW THE UNOCCUPIED HEATING TEMPERATURE SET POINT, THE SPLIT-SYSTEM SHALL BE ENABLED.
2. WHEN THE UNOCCUPIED TEMPERATURE SET POINT IS ACHIEVED THE REVERSE SHALL OCCUR.

DUCTLESS SPLIT-SYSTEMS (ACU / ACC)



GENERAL

1. CABINET UNIT HEATER MANUFACTURER SHALL PROVIDE 2-WAY CONTROL VALVE WITH LOW VOLTAGE ACTUATOR AND LOW VOLTAGE WALL MOUNTED THERMOSTAT.

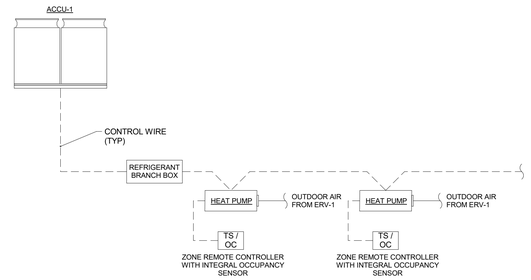
OCCUPIED SEQUENCE

1. UPON A CALL FROM THE ZONE TEMPERATURE SENSOR THE FAN SHALL TURN ON AND THE 2-WAY HOT WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SET POINT.

UNOCCUPIED SEQUENCE

1. UPON A CALL FROM THE ZONE TEMPERATURE SENSOR THE FAN SHALL TURN ON AND THE 2-WAY HOT WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SET POINT.

CABINET UNIT HEATER / UNIT HEATER



GENERAL

1. VRF SYSTEM SHALL BE CONTROLLED BY MANUFACTURER'S STAND-ALONE PACKAGED CONTROLS.
2. OCCUPIED AND UNOCCUPIED MODE SHALL BE CONTROLLED BY THE INTEGRAL OCCUPANCY SENSORS ON THE ZONE REMOTE CONTROLLERS.

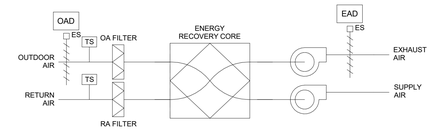
OCCUPIED SEQUENCE

1. WHEN IN OCCUPIED MODE EACH HEAT PUMP SHALL OPERATE TO MAINTAIN THE OCCUPIED HEATING AND COOLING TEMPERATURE SET POINTS.
2. EACH HEAT PUMP SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN OCCUPIED MODE.

UNOCCUPIED SEQUENCE

1. WHEN IN UNOCCUPIED MODE EACH HEAT PUMP SHALL BE OFF. IF A SPACE TEMPERATURE SENSOR GOES ABOVE THE UNOCCUPIED COOLING TEMPERATURE SET POINT OR BELOW THE UNOCCUPIED HEATING TEMPERATURE SET POINT, THE RESPECTIVE HEAT PUMP SHALL BE ENABLED.
2. WHEN THE UNOCCUPIED TEMPERATURE SET POINT IS ACHIEVED THE REVERSE SHALL OCCUR.

VARIABLE REFRIGERANT FLOW (VRF) SYSTEM



GENERAL

1. ENERGY RECOVERY VENTILATOR (ERV-1) SHALL BE CONTROLLED BY THE MANUFACTURER'S STAND-ALONE PACKAGED CONTROLS.
2. OUTDOOR AIR AND EXHAUST AIR MOTORIZED DAMPERS SHALL BE INTERLOCKED WITH THE OPERATION OF THE ERV.
3. WHEN OFF, THE SUPPLY AND EXHAUST FAN SHALL BE OFF WITH THE ASSOCIATED OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER CLOSED.
4. OCCUPIED AND UNOCCUPIED MODE SHALL BE BASED ON A TIME OF DAY SCHEDULE SETUP IN THE ERV REMOTE CONTROLLER.

OCCUPIED SEQUENCE

1. WHEN COMMANDED TO START THE OUTDOOR AIR AND EXHAUST AIR DAMPER SHALL OPEN AND THE SUPPLY AND EXHAUST FANS SHALL START.
2. THE ERV WILL BE SET TO OPERATE IN AUTO MODE. AUTO MODE SHALL AUTOMATICALLY CHANGE OPERATION BETWEEN BYPASS AND ENERGY RECOVERY MODE BASED ON RETURN AND OUTSIDE AIR TEMPERATURE AND OPERATION MODE OF INDOOR/OUTDOOR UNIT(S).
3. THE SUPPLY FAN AND EXHAUST FAN SHALL RUN CONTINUOUSLY IN THE OCCUPIED MODE.

UNOCCUPIED SEQUENCE

1. WHEN IN UNOCCUPIED MODE, THE SUPPLY AND EXHAUST FAN SHALL BE OFF, AND THE OUTSIDE AIR AND EXHAUST AIR DAMPERS SHALL BE CLOSED.

ENERGY RECOVERY VENTILATOR (ERV-1)

Project:

Mass DMH Department of Mental Health

391 VARNUM AVE, LOWELL, MASSACHUSETTS

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

Date: 4/11/2019

Drawn By: MRC

Reviewed By: SES

Approved By: SEH

W&S Project No: 2180884

Drawing Title:

HVAC CONTROL DIAGRAMS

Sheet Number:

H-701

ELECTRICAL GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC ONLY. THE EXACT LOCATION, MOUNTING HEIGHTS, SIZE OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED AND DETERMINED IN THE FIELD.
2. ALL STRAIGHT FEEDER, BRANCH CIRCUIT AND AUXILIARY SYSTEM CONDUIT RUNS SHALL BE PROVIDED WITH SUFFICIENT PULL BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 150 FEET. EXACT SIZES OF PULL BOXES AND LOCATIONS TO BE DETERMINED IN THE FIELD BY THE ELECTRICAL CONTRACTOR.
3. FURNISH ALL REQUIRED ACCESS PANELS AS REQUIRED TO SUIT FIELD CONDITIONS FOR THE PROPER OPERATION AND MAINTENANCE OF THE ELECTRICAL SYSTEM. THE EXACT SIZES AND PHYSICAL LOCATIONS SHALL BE TO SUIT ACCESSIBILITY AND CONSTRUCTION CONDITIONS. ALL ACCESS PANELS PROVIDED BY THE ELECTRICAL CONTRACTOR SHALL MATCH EXACTLY THE ACCESS PANELS FURNISHED AND INSTALLED BY THE GENERAL CONTRACTOR. THE ACCESS PANELS WILL BE INSTALLED BY THE TRADE CONTRACTOR UNDER THE APPROPRIATE SECTION OF THE SPECIFICATIONS FOR THE SURFACE IN WHICH THE PANELS ARE LOCATED.
4. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE HVAC CONTRACTOR AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT; THE POWER WIRING, CONTROL WIRING AND ALL ELECTRICAL CONNECTIONS AND CONDUIT TURN-UPS SHALL BE COORDINATED WITH THE RESPECTIVE CONTRACTORS BEFORE THE START OF CONSTRUCTION IN THE FIELD.
5. SLEEVES ARE TO BE UTILIZED FOR PASSAGE OF CONDUITS THROUGH FLOORS OR WALLS. CONDUITS AND BOXES ARE TO BE SUPPORTED BY THE USE OF PRESET FASTENERS INSTALLED IN FLOORS, WALLS OR COLUMNS. CONDUITS AND BOXES ARE TO BE INSTALLED CONCEALED IN MASONRY WALLS AND ABOVE HUNG CEILINGS. ALL SLEEVES ARE TO BE SEALED WITH APPROVED FIRE STOPPING SEALANT.
6. THE LOCATION AND MOUNTING HEIGHTS OF ALL POWER DEVICES SHOWN ON THE ARCHITECTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER THE LOCATIONS SHOWN ON THE ELECTRICAL DRAWINGS. THE ELECTRICAL CONTRACTOR SHALL INSTALL ALL POWER DEVICES TO AGREE WITH THE ARCHITECTURAL DRAWINGS.
7. COMBINED HOMERUNS OF TWO (2) OR THREE (3) CIRCUITS MAY BE UTILIZED. HOWEVER, THE NEUTRAL CONDUCTOR IS TO BE INCREASED TO #10AWG. COMBINED HOMERUNS ARE TO BE LIMITED TO 20A, POWER CIRCUITS.
8. WORK SHALL CONFORM TO THE MASSACHUSETTS ELECTRICAL CODE, MASSACHUSETTS BUILDING CODE, NFPA AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION.
9. THE WORD "CONTRACTOR" AS USED IN THE "ELECTRICAL WORK" SHALL MEAN THE ELECTRICAL SUBCONTRACTOR.
10. CONTRACTOR SHALL PAY FOR ALL PERMITS, INSURANCE AND TESTS, AND SHALL PROVIDE LABOR AND MATERIAL TO COMPLETE THE ELECTRICAL WORK SHOWN.
11. EXCEPT AS OTHERWISE NOTED, THE ELECTRICAL WORK SHALL INCLUDE DEMOLITION, PANELBOARDS, CIRCUIT BREAKERS, FEEDERS, WIRING, RACEWAYS, DEVICES, SAFETY SWITCHES AND CONNECTION NECESSARY TO OPERATE MOTORS AND OTHER EQUIPMENT.
12. AUTOMATIC TEMPERATURE CONTROLS SHALL BE PROVIDED AND INSTALLED BY THE MECHANICAL SUBCONTRACTOR. STARTERS, VFD'S AND OTHER CONTROL DEVICES FOR EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL SUBCONTRACTOR FOR INSTALLATION AND CONNECTION BY THIS CONTRACTOR.
13. DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK NEAT, CLEAN AND ORDERLY.
14. ALL SYSTEMS SHALL BE TESTED FOR SHORT CIRCUIT AND GROUNDS PRIOR TO ENERGIZING AND ANY DEFECTS SHALL BE CORRECTED.
15. ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL WORK SHALL BE INCLUDED AS PART OF THIS SECTION.
16. COMPLETE SHOP DRAWINGS SHALL BE SUBMITTED FOR ELECTRICAL EQUIPMENT. WHERE SPECIFIED ELECTRICAL EQUIPMENT IS SUBSTITUTED, THE ELECTRICAL CONTRACTOR SHALL SUBMIT COMPLETE SPECIFICATIONS ON THE SUBSTITUTE AS WELL AS THE ITEM ORIGINALLY SPECIFIED.
17. MATERIALS SHALL BE SPECIFICATION GRADE AND UL LISTED.
18. WHERE MATERIAL IS CALLED OUT IN THE LEGEND BY MANUFACTURER, TYPE OR CATALOG NUMBER, SUCH DESIGNATIONS ARE TO ESTABLISH STANDARDS OR DESIRED QUALITY. ACCEPTANCE OR REJECTIONS OF PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER.
19. WORK SHALL BE COORDINATED WITH THAT OF OTHER TRADES TO ELIMINATE INTERFERENCES.
20. EXACT LOCATIONS OF MECHANICAL EQUIPMENT, DEVICES, ETC. SHALL BE VERIFIED WITH HEATING, VENTILATION AND AIR CONDITIONING SUBCONTRACTOR PRIOR TO ROUGHING FOR SAME.
21. ELECTRICAL CONTRACTOR SHALL OBTAIN SHOP DRAWINGS/SPECIFICATIONS OF ALL EQUIPMENT FROM THE GENERAL CONTRACTOR PRIOR TO PURCHASING AND INSTALLING ELECTRICAL EQUIPMENT FOR SAME. NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL EQUIPMENT INSTALLED AND CONTRACT DOCUMENTS.
22. ELECTRICAL WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF WHICH SYSTEM IS PUT INTO SERVICE.
23. WORK SHALL BE GROUNDED IN ACCORDANCE WITH CODE REQUIREMENTS. COMPLETE EQUIPMENT (INSULATED GREEN WIRE) GROUNDING SYSTEM SHALL BE INSTALLED.
24. BOXES SHALL BE GALVANIZED STEEL AND SHALL BE SIZED TO ACCOMMODATE THE EQUIPMENT OR APPARATUS TO BE INSTALLED. WHERE BOXES OF A STANDARD MAKE ARE NOT AVAILABLE, SPECIAL BOXES SHALL BE MANUFACTURED. FIXTURES SUPPORTED ON THE CEILING OR ON THE WALL SHALL HAVE SUITABLE FIXTURE SUPPORT FOR THE SPECIFIC FIXTURE.
25. PANELBOARDS SHALL BE DEAD FRONT, THERMAL MAGNETIC BOLT-ON CIRCUIT BREAKER TYPE, DESIGNED FOR SURFACE OR FLUSH MOUNTING AS INDICATED ON PLAN, AND HAVING CONNECTIONS TO 120/208 OR 277/480 VOLT, 3 PHASE, 4 WIRE SERVICE. ALL BUS BARS SHALL BE COPPER. CABINETS SHALL BE MADE OF CODE GAUGE GALVANIZED SHEET STEEL, WITH A MINIMUM OF 4 INCH GUTTERS, DOOR IN DOOR CONSTRUCTION, LOCKED DOOR, AND FLUSH HINGES. TYPEWRITTEN INDEX SHALL BE MOUNTED ON DOOR INSIDE TRANSPARENT COVER INDICATING LOAD SERVED. PANELS SHALL INCLUDE SEPARATE EQUIPMENT GROUND BUS.
26. PANELBOARDS, DISCONNECT SWITCHES, AND CONTROLLERS SHALL HAVE NAMEPLATES OF BLACK LAMINATED PLASTIC WITH ENGRAVED WHITE LETTERS, SECURED WITH SELF-TAPPING SCREWS.
27. CONNECTIONS AT MOTORS SHALL BE MADE WITH 18" LENGTH OF 1/2 INCH FLEXIBLE LIQUID TIGHT CONDUIT.
28. CONTRACTOR SHALL PHASE BALANCE PANELBOARDS IN THE FIELD. LOAD ON EACH PHASE SHALL BE BALANCED WITHIN 10% OF EACH OTHER.
29. DUPLEX WALL RECEPTACLES SHALL BE 2 POLE, 3 WIRE, GROUNDING TYPE 20 AMPERE, 125 VOLT WITH METAL PLASTER EARS. RECEPTACLES SHALL BE NEMA STANDARD CONFIGURATION 5-20R.
30. FUSED OR UNFUSED SAFETY SWITCHES SHALL BE TOTALLY ENCLOSED, HEAVY DUTY TYPE. SWITCHES SHALL HAVE VOLTAGE, HORSEPOWER BUILDING OR IN DAMP/WET LOCATIONS SHALL BE IN A NEMA 3R ENCLOSURE.
31. FUSES SHALL BE DUAL ELEMENT, TIME DELAY TYPE, AS MANUFACURED BY BUSSMAN, RELIANCE OR APPROVED EQUAL.
32. FURNISH AND INSTALL SLEEVES IN FLOORS, BEAMS, WALLS, ETC. REQUIRED FOR INSTALLING THIS WORK.
33. CONDUIT PASSING THROUGH FIRE RATED WALLS AND FLOORS SHALL BE PROVIDED WITH ALL NECESSARY MATERIALS TO ENSURE THAT THE FIRE RATED INTEGRITY IS MAINTAINED.
34. FEEDER TAPS WILL NOT BE ALLOWED IN PANELBOARD GUTTERS.
35. CONTRACTOR SHALL CHECK EXISTING CONDITIONS TO DETERMINE EXACT EXTENT OF WORK TO BE PERFORMED PRIOR TO BIDDING. DIMENSIONS RELEVANT TO EXISTING WORK SHALL BE VERIFIED IN THE FIELD.
36. IN AREAS NOT AFFECTED BY THIS RENOVATION, THIS SUBCONTRACTOR SHALL MAINTAIN CONTINUITY OF ELECTRIC SERVICE.
37. WHERE CONNECTIONS ARE MADE IN EXISTING PANELS, THE PANEL INDEX SHALL BE REVISED TO INDICATE THE NEW LOADS SERVED. NEW CIRCUIT BREAKERS ADDED TO EXISTING PANELS SHALL BE THE SAME FRAME SIZE, VOLTAGE RATING AND INTERRUPTING CAPACITY AS EXISTING PANEL AND CIRCUIT BREAKERS.
38. PROVIDE AS-BUILT "CADD" DRAWINGS AT THE COMPLETION OF THE PROJECT.

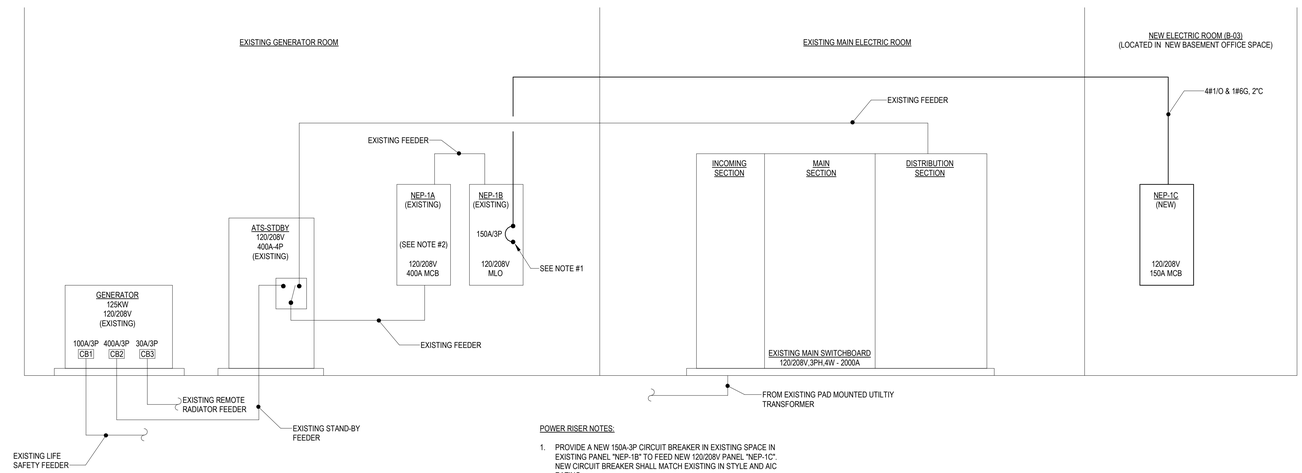
ELECTRICAL SYMBOL LEGEND

SYMBOL	DESCRIPTION
TMS	THERMAL MOTOR SWITCH
	DUPLEX RECEPT.
J	JUNCTION BOX
	CIRCUIT BREAKER PANEL
	POWER OR DISTRIBUTION PANEL
XX-1	MOTOR (SEE SCHEDULE)
	COMB. MOTOR STARTER (FUSED)
	SAFETY DISC. SW. (NON-FUSED)
	SAFETY DISC. SW. (FUSED)
	DUCT SMOKE DETECTOR (TYPE DENOTED)
RS	REMOTE TEST/STATUS STATION

ELECTRICAL ABBREVIATIONS LIST

(NOT ALL ABBREVIATIONS ARE APPLICABLE FOR THIS PROJECT)

1P	1 POLE (2P, 3P, 4P, ETC.)	CTR	CENTER	HT	HEIGHT	NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION	SWBD	SWITCHBOARD
A	AMPERE	CU	COPPER	HTG	HEATING			SYM	SYMMETRICAL
AC	ABOVE COUNTER OR AIR CONDITIONER	DCP	DOMESTIC WATER CIRCULATING PUMP	HTR	HEATER	NFDS	NON-FUSED SAFETY DISCONNECT SWITCH	SYS	SYSTEM
		DEPT	DEPARTMENT	HV	HIGH VOLTAGE			TEL	TELEPHONE
ACLG	ABOVE CEILING	DET	DETAIL	HVAC	HEATING, VENTILATING AND AIR CONDITIONING	NIC	NOT IN CONTRACT	TEL/DATA	TELEPHONE/DATA
ADO	AUTOMATIC DOOR OPENER	DIA	DIAMETER			NL	NIGHT LIGHT	TERM	TERMINAL
AF	AMP FRAME	DISC	DISCONNECT	HWP	HYDRONIC WATER PUMP	N.O.	NORMALLY OPEN	TL	TWIST LOCK
AFF	ABOVE FINISHED FLOOR	DIST	DISTRIBUTION	IC	INTERRUPTING CAPACITY	NPF	NORMAL POWER FACTOR	T-STAT	THERMOSTAT
AFG	ABOVE FINISHED GRADE	DN	DOWN	IG	ISOLATED GROUND	NTS	NOT TO SCALE	TTC	TELEPHONE TERMINAL CABINET
AFI	ARC FAULT CIRCUIT INTERRUPTER	DPR	DAMPER	IMC	INTERMEDIATE METAL CONDUIT	OH	OVERHEAD	TV	TELEVISION
		DS	SAFETY DISCONNECT SWITCH	INCAND	INCANDESCENT	OL	OVERLOADS	TVTC	TELEVISION TERMINAL CABINET
AHU	AIR HANDLING UNIT	DT	DOUBLE THROW	IR	INFRARED	PA	PUBLIC ADDRESS		
AL	ALUMINUM	DWG	DRAWING	I/W	INTERLOCK WITH	PB	PULL BOX OR PUSHBUTTON	TYP	TYPICAL
ALT	ALTERNATE	EC	ELECTRICAL CONTRACTOR	J-BOX	JUNCTION BOX	PE	PNEUMATIC ELECTRIC	UC	UNDER COUNTER
AMP	AMPERE	ELEC	ELECTRIC, ELECTRICAL	KV	KILOVOLT	PED	PEDESTAL	UE	UNDERGROUND ELECTRICAL
AMPL	AMPLIFIER	ELEV	ELEVATOR	KVA	KILOVOLT-AMPERE	PF	POWER FACTOR	UG	UNDERGROUND
ANNUN	ANNUNCIATOR	EM	EMERGENCY	KVAR	KILOVOLT-AMPERE REACTIVE	PH	PHASE	UH	UNIT HEATER
APPROX	APPROXIMATELY	EMS	ENERGY MANAGEMENT SYSTEM	KW	KILOWATT	PIV	POST INDICATING VALVE	UT	UNDERGROUND TELEPHONE
AQ-STAT	AQUASTAT	EMT	ELECTRICAL METALLIC TUBING	KWH	KILOWATT HOUR	PNL	PANEL	UTIL	UTILITY
ARCH	ARCHITECT, ARCHITECTURAL	EP	ELECTRIC PNEUMATIC	LOC	LOCATE OR LOCATION	PP	POWER POLE	UV	UNIT VENTILATOR OR ULTRAVIOLET
AS	AMP SWITCH	EQUIP	EQUIPMENT	LT	LIGHT	PR	PAIR		
AT	AMP TRIP	EWC	ELECTRIC WATER COOLER	LTG	LIGHTING	PRI	PRIMARY	V	VOLT
ATS	AUTOMATIC TRANSFER SWITCH	EXIST	EXISTING	LTNG	LIGHTNING	PROJ	PROJECTION	VA	VOLT-AMPERES
AUTO	AUTOMATIC	EXH	EXHAUST	LV	LOW VOLTAGE	PRV	POWER ROOF VENTILATOR	VDT	VIDEO DISPLAY TERMINAL
AUX	AUXILIARY	EXP	EXPLOSION PROOF	MAX	MAXIMUM	PT	POTENTIAL TRANSFORMER	VERT	VERTICAL
AV	AUDIO VISUAL	FA	FIRE ALARM	MAG.S	MAGNETIC STARTER	PVC	POLYVINYL CHLORIDE (CONDUIT)	VFD	VARIABLE FREQUENCY DRIVE
AWG	AMERICAN WIRE GAUGE	FABP	FIRE ALARM BOOSTER POWER	M/C	MOMENTARY CONTACT	PWR	POWER	VOL	VOLUME
BATT	BATTERY		SUPPLY PANEL	MC	MECHANICAL CONTRACTOR	QUAN	QUANTITY	W	WATT
BD	BOARD	FACP	FIRE ALARM CONTROL PANEL	MCB	MAIN CIRCUIT BREAKER	RCPT	RECEPTACLE	W/	WITH
BLDG	BUILDING	FCU	FAN COIL UNIT	MCC	MOTOR CONTROL CENTER	REQD	REQUIRED	WG	WIRE GUARD
BMS	BUILDING MANAGEMENT SYSTEM	FIXT	FIXTURE	MDC	MAIN DISTRIBUTION CENTER	RM	ROOM	WH	WATER HEATER
C	CONDUIT	FLR	FLOOR	MDP	MAIN DISTRIBUTION PANEL	RSC	RIGID STEEL CONDUIT	W/O	WITHOUT
CAB	CABINET	FLUOR	FLUORESCENT	MFR	MANUFACTURER	RTU	ROOF TOP UNIT	WP	WEATHERPROOF
CAT	CATALOG	FU	FUSE	MFS	MAIN FUSED DISCONNECT SWITCH	SC	SURFACE CONDUIT	XFMR	TRANSFORMER
CATV	CABLE TELEVISION	FUDS	FUSED SAFETY DISCONNECT SWITCH	MH	MANHOLE	SEC	SECONDARY	XFR	TRANSFER
CB	CIRCUIT BREAKER	GA	GAUGE	MIC	MICROPHONE	SHT	SHEET		
CCTV	CLOSED CIRCUIT TELEVISION	GAL	GALLON	MIN	MINIMUM	SIM	SIMILAR		
CKT	CIRCUIT	GALV	GALVANIZED	MISC	MISCELLANEOUS	S/N	SOLID NEUTRAL		
CLG	CEILING	GC	GENERAL CONTRACTOR	MLO	MAIN LUGS ONLY	SPEC	SPECIFICATION	∠	ANGLE
COMB	COMBINATION	GEN	GENERATOR	MMS	MANUAL MOTOR STARTER	SPKR	SPEAKER	@	AT
CMPR	COMPRESSOR	GFI	GROUND FAULT CIRCUIT INTERRUPTER	MOA	MULTIOUTLET ASSEMBLY	SP	SPARE	Δ	DELTA
CONN	CONNECTION	GFP	GROUND FAULT PROTECTOR	MSP	MOTOR STARTER PANELBOARD	SR	SURFACE RACEWAY	'	FEET
CONST	CONSTRUCTION	GND	GROUND	MSBD	MAIN SWITCHBOARD	SS	STAINLESS STEEL	"	INCHES
CONT	CONTINUATION OR CONTINUOUS	GRS	GALVANIZED RIGID STEEL (CONDUIT)	MT	MOUNT	SSW	SELECTOR SWITCH	#	NUMBER
CONTR	CONTRACTOR	GYP BD	GYPSUM BOARD	MTC	EMPTY CONDUIT	S/S	STOP/START PUSHBUTTONS	Ø	PHASE
CONV	CONVECTOR	HOA	HANDS-OFF-AUTOMATIC SWITCH	MTS	MANUAL TRANSFER SWITCH	STA	STATION	C	CENTER LINE
CP	CIRCULATING PUMP	HORIZ	HORIZONTAL	MTR	MOTOR, MOTORIZED	STD	STANDARD	P	PLATE
CRT	CATHODE-RAY TUBE	HP	HORSEPOWER	N.C.	NORMALLY CLOSED	SURF	SURFACE MOUNTED		
CT	CURRENT TRANSFORMER	HPF	HIGH POWER FACTOR	NEC	NATIONAL ELECTRICAL CODE	SW	SWITCH		



POWER RISER NOTES:

1. PROVIDE A NEW 150A-3P CIRCUIT BREAKER IN EXISTING SPACE IN EXISTING PANEL "NEP-1B" TO FEED NEW 120/208V PANEL "NEP-1C". NEW CIRCUIT BREAKER SHALL MATCH EXISTING IN STYLE AND AIC RATING.
2. ELECTRICAL CONTRACTOR TO CONFIRM (8) EXISTING HEATERS SERVING THE SECOND FLOOR ARE NO LONGER ACTIVE AND SHALL BE DISCONNECTED FROM EXISTING PANEL "NEP-1A". ONCE HEATERS ARE CONFIRMED TO BE DISCONNECTED THE (8) EXISTING 20A-2P CIRCUIT BREAKERS SHALL BE TURNED OFF AND LABELED AS SPARE.

1 E-101 ELECTRICAL ONE-LINE DIAGRAM
NOT TO SCALE

Branch Panel: NEP-1C

Location: ELEC B-03
Supply From:
Mounting: SURFACE
Enclosure: NEMA 1

Volts: 208Y/120
Phases: 3
Wires: 4

A.I.C. Rating: 10,000 AMPS SYMMETRICAL
Mains Type: MAIN CB
Mains Rating: 225.0 A
MCB Rating: 150.0 A

Notes:

CKT	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	CKT
1	HEAT PUMPS - HP-1,HP-2,HP-3,HP-4,HP-5	20.0 A	2	0.5 kVA 0.2 kVA			2	20.0 A	HEAT PUMPS - HP-6,HP-7,HP-8,HP-9,HP-10,HP-11	2
3					0.5 kVA 0.2 kVA					4
5	HEAT PUMPS - HP-12,HP-13	20.0 A	2			0.1 kVA 1.4 kVA	3	20.0 A	ENERGY RECOVERY UNIT - ERV-1	6
7				0.1 kVA 1.4 kVA						8
9	BC CONTROLLER	20.0 A	2		0.2 kVA 1.4 kVA					10
11						0.2 kVA 1.5 kVA	2	20.0 A	UNIT HEATER - UH-1 (STORAGE B-29)	12
13	UNIT HEATER - UH-2 (STORAGE B-27)	20.0 A	2	1.5 kVA 1.5 kVA						14
15					1.5 kVA 6.4 kVA		3	90.0 A	AIR COOLED CONDESNING UNIT - ACCU-1 (BASEMENT LEVEL)	16
17	CABINET UNIT HEATER - CUH-1	20.0 A	1			0.1 kVA 6.4 kVA				18
19	AIR COOLED CONDENSING UNIT - ACCU-1	30.0 A	2	1.1 kVA 6.4 kVA						20
21	(ROOF OUTDOOR UNIT) POWERS INDOOR...				1.1 kVA 1.1 kVA		2	30.0 A	AIR COOLED CONDENSING UNIT - ACCU-2 (ROOF OUTDOOR UNIT) POWERS INDOOR...	22
23	ROOF TOP RECEPTACLE	20.0 A	1			0.4 kVA 1.1 kVA				24
25	OUTDOOR RECEPTACLE	20.0 A	1	0.2 kVA						26
27										28
29										30
31										32
33										34
35										36
37										38
39										40
41										42
			Total Load:	12.9 kVA	12.4 kVA	11.2 kVA				
			Total Amps:	109.5 A	105.3 A	93.3 A				

Legend:

Notes:

MOTOR CIRCUIT SCHEDULE

EQUIPMENT	LOAD INFORMATION: LOAD	VOLT	PHASE	BKR AMPS	PANEL	CKT #	WIRING	LOCAL DISC. SW	STARTER	VFD	CONNECTION: RECEPTACLE	THERMAL MOTOR SWITCH	WEATHER PROOF	JUNCTION BOX	REMARKS
AIR COOLED CONDENSING UNIT - ACCU-1 (ROOF OUTDOOR UNIT) POWERS INDOOR UNIT ACU-1	11.0 MCA	208 V	1	30.0 A	NEP-1C	19,21	2#10 & 1#10G, 3/4"C	240V,30A,3P NEMA 3R FUSED					X		
AIR COOLED CONDENSING UNIT - ACCU-2 (ROOF OUTDOOR UNIT) POWERS INDOOR UNIT ACU-2	11.0 MCA	208 V	1	30.0 A	NEP-1C	22,24	2#10 & 1#10G, 3/4"C	240V,30A,3P NEMA 3R FUSED					X		
AIR COOLED CONDESNING UNIT - ACCU-1 (BASEMENT LEVEL)	53.0 MCA	208 V	3	90.0 A	NEP-1C	16,18,20	3#2 & 1#8G, 1-1/4"C	240V,100A,3P, NEMA 3R FUSED					X		
BC CONTROLLER	1.65 MCA	208 V	1	20.0 A	NEP-1C	9,11	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							
CABINET UNIT HEATER - CUH-1	.80 MCA	120 V	1	20.0 A	NEP-1C	17	2#12 & 1#12G, 3/4"C	120V THERMAL SWITCH				X			
ENERGY RECOVERY UNIT - ERV-1	11.9 MCA	208 V	3	20.0 A	NEP-1C	6,8,10	3#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							
HEAT PUMPS - HP-1,HP-2,HP-3,HP-4,HP-5	1.45 MCA	208 V	1	20.0 A	NEP-1C	1,3	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							PROVIDE DISCONNECT AT EACH HEAT PUMP
HEAT PUMPS - HP-6,HP-7,HP-8,HP-9,HP-10,HP-11	.50 MCA	208 V	1	20.0 A	NEP-1C	2,4	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							PROVIDE DISCONNECT AT EACH HEAT PUMP
HEAT PUMPS - HP-12,HP-13	1.05 MCA	208 V	1	20.0 A	NEP-1C	5,7	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							PROVIDE DISCONNECT AT EACH HEAT PUMP
UNIT HEATER - UH-1 (STORAGE B-29)	14.5 MCA	208 V	1	20.0 A	NEP-1C	12,14	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							
UNIT HEATER - UH-2 (STORAGE B-27)	14.5 MCA	208 V	1	20.0 A	NEP-1C	13,15	2#12 & 1#12G, 3/4"C	240V,30A,3P NEMA 1							

Project:
Mass DMH Department of Mental Health
Project Name
Enter address here

Weston & Sampson
Weston & Sampson Engineers, Inc.
5 Centennial Drive,
Peabody, MA 01960
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

PROJECT TRUE

SCALE: AS NOTED

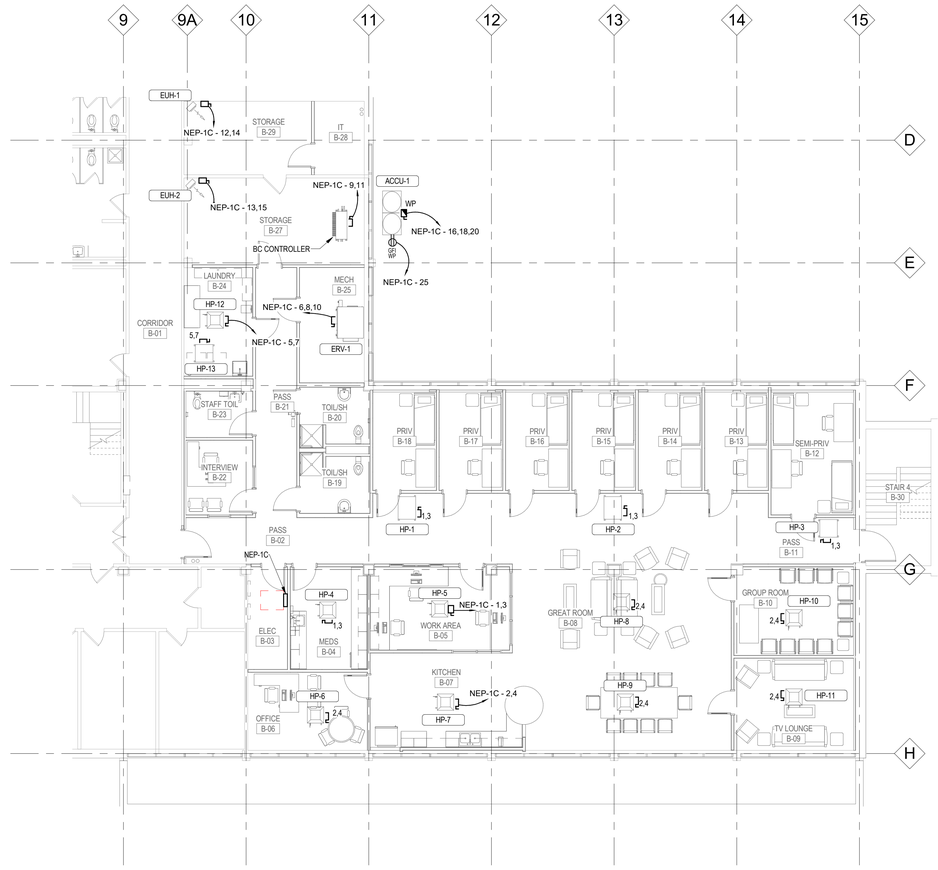
Date: 4/11/2019
Drawn By: MAS
Reviewed By: DNM
Approved By: RFM
W&S Project No: 2180884

Drawing Title:
ELECTRICAL LEGEND, PLANS & SCHEDULES

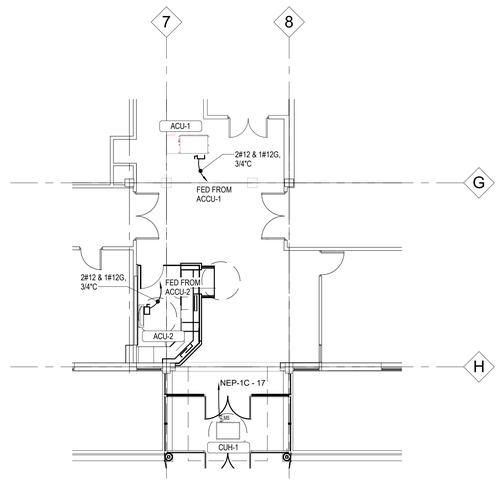
Sheet Number:
E-101

DRAWING NOTES:

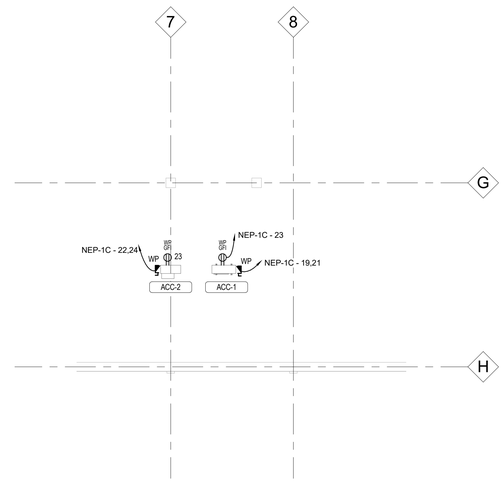
1. REFER TO DRAWING E-101 FOR LEGEND, ABBREVIATIONS, GENERAL NOTES, POWER RISER DIAGRAM, MEHCANICAL EQUIPMENT SCHEDULE AND ELECTRICAL PANEL SCHEDULE.



1 E-102 BASEMENT POWER PLAN
1/8" = 1'-0"



2 E-102 LEVEL 1 POWER PLAN
1/8" = 1'-0"



3 E-102 ROOF POWER PLAN
1/8" = 1'-0"

Project:

Mass DMH Department of Mental Health

Project Name

Enter address here

Weston & Sampson

Weston & Sampson Engineers, Inc.
5 Centennial Drive,
Peabody, MA 01960
(978) 532-1900 (800) SAMPSON
www.westonandsampson.com

Consultants:

Seal:

Revisions:

Rev	Date	Description

Issued For: BID SET

PROJECT TRUE

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

Date: 4/11/2019
Drawn By: MAS
Reviewed By: DNM
Approved By: RFM
W&S Project No: 2180884

Drawing Title:

ELECTRICAL POWER PART PLANS

Sheet Number:

E-102