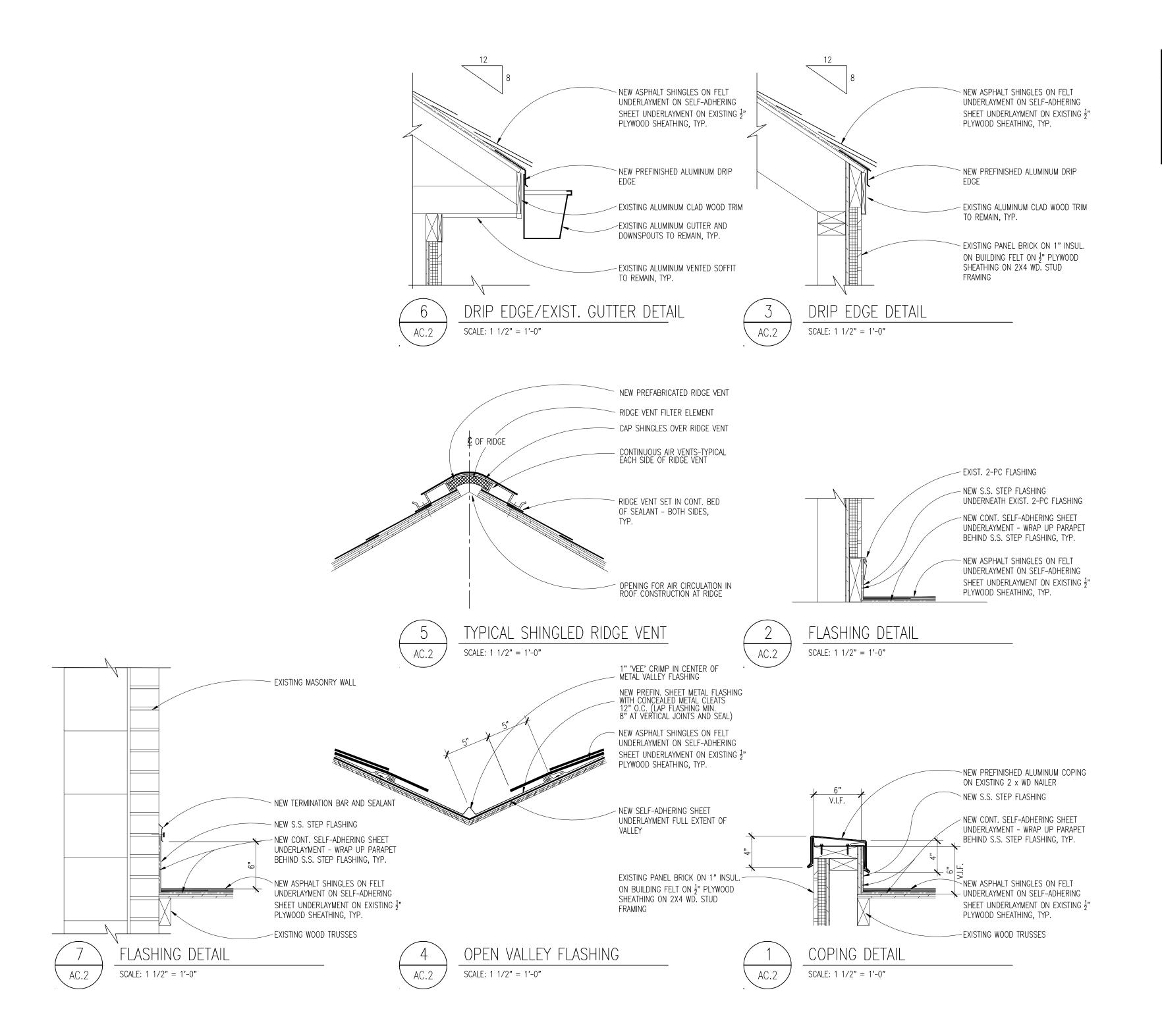
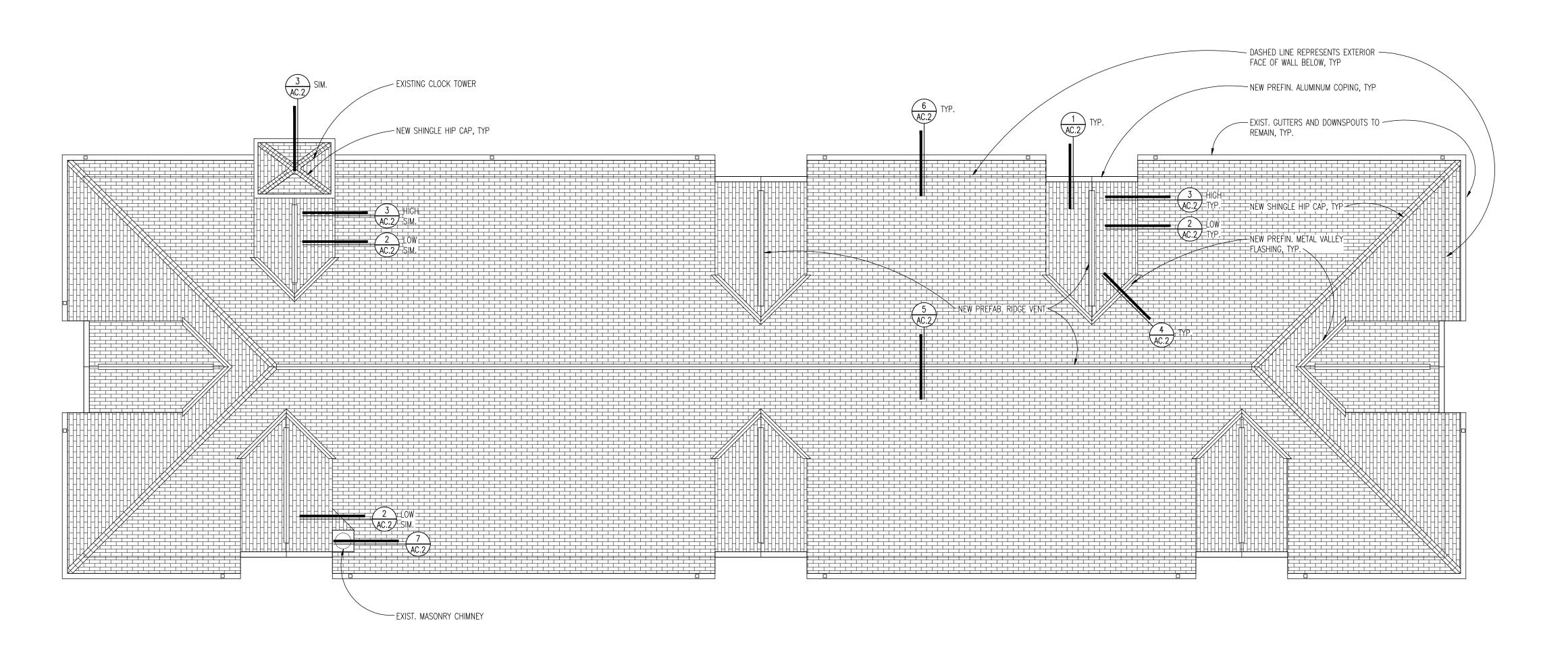


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(OR CONSTRUCTION WORK DIVISION LINE)







ROOF PLAN LEGEND

REMOVE EXISTING SHINGLES, ALL UNDERLAYMENTS AND EXISTING STEP FLASHINGS DOWN TO EXISTING PLYWOOD DECK. INSTALL NEW ASPHALT SHINGLES ON FELT UNDERLAYMENT ON SELF-ADHERING SHEET UNDERLAYMENT ON EXISTING ½" PLYWOOD DECK. PROVIDE ALL FLASHINGS DETAILED AND AS REQUIRED FOR A COMPLETE AND WEATHER-TIGHT ROOFING SYSTEM INSTALLATION.



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Administration
Building
Upgrades

Plymouth-Canton Community Schools

DRAWING TITLE
Composite Roof Plan
And Details

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MECHANICAL ABBREVIATION LIST <u>ABBREVIATION</u> <u>DESCRIPTION</u> <u>ABBREVIATION</u> <u>DESCRIPTION</u> FLOOR DRAIN COMPRESSED AIR OXYGEN COMPRESSED AIR (SPECIFIC PSIG) FUNNEL FLOOR DRAIN OUTSIDE AIR AUTOMATIC AIR VENT FIRE HYDRANT OUTSIDE AIR TEMPERATURE AAVACC AIR COOLED CONDENSER FIRE HOSE CABINET OPPOSED BLADE DAMPER AIR COOLED CONDENSING UNIT ACCU FIRE HOSE RACK ON CENTER/CENTER TO CENTER ACCESS DOOR FIRE HOSE VALVE OUTSIDE DIÂMETER AREA DRAIN FULL LOAD AMPS OPEN ENDED DUCT AIR EXTRACTOR OWNER FURNISHED, CONTRACTOR INSTALLED OFCI ABOVE FINISHED FLOOR FLOW METER OWNER FURNISHED, OWNER INSTALLED FLOW MEASURING STATION OVERLOAD AIR HANDLING UNIT FEET PER MINUTE ALTERNATE OVERFLOW RAIN CONDUCTOR AMPERE FIRE PUMP OVERFLOW ROOF DRAIN FAN POWERED (AIR) TERMINAL UNIT AIR PRESSURE DROP OUTSIDE SCREW AND YOKE ARGON FLOOR SINK OUTLET VELOCITY ASHRAE AMERICAN SOCIETY OF HEATING, REFRIGERATION FOOD SERVICE EQUIPMENT CONTRACTOR OPERATOR WORKSTATION AND AIR-CONDITIONING ENGINEERS FINNED TUBE RADIATION PACKAGED AIR CONDITIONING UNIT AUTOMATIC SPRINKLER RISER AUXILIARY FACE VELOCITY PARALLEL BLADE DAMPER AUX ACID VENT PUMPED CONDENSATE AVTR ACID VENT THROUGH ROOF NATURAL GAS PROCESS COOLING WATER ACID WASTE GAUGE PROCESS COOLING WATER RETURN PROCESS COOLING WATER SUPPLY GALLON BUILDING AUTOMATION SYSTEM GRAVITY RELIEF HOOD PRESSURE DROP (FEET OF WATER) BLOWER COIL UNIT GALLONS PER HOUR PERIMETER HEAT PERIMETER HEAT RETURN BACKDRAFT DAMPER GALLONS PER MINUTE BELOW FINISHED FLOOR PERIMETER HEAT SUPPLY BACKFLOW PREVENTER HYDROGEN PANEL BRAKE HORSEPOWER HOSE BIBB PARTS PER MILLION BOD BOTTOM OF DUCT HEATING COIL PRESSURE PRESSURE REDUCING VALVE BOP BOTTOM OF PIPE HOT DECK BRITISH THERMAL UNIT HIGH EFFICIENCY PARTICULATE ARRESTANCE PUMPED SANITARY BTUH BRITISH THERMAL UNIT PER HOUR PUMPED STORM HIGH LIMIT POUNDS PER SQUARE INCH BACKWATER VALVE HAND/OFF/AUTO HEAT PUMP POUNDS PER SQUARE INCH - ABSOLUTE COMMON HORSEPOWER POUNDS PER SQUARE INCH - GAUGE CAPACITY **HPCW** HIGH PRESSURE DOMESTIC COLD WATER PURIFIED WATER PURIFIED WATER RETURN CAV CONSTANT AIR VOLUME HIGH PRESSURE DOMESTIC HOT WATER HIGH PRESSURE DOMESTIC HOT WATER RETURN CATCH BASIN HPHWR PURIFIED WATER SUPPLY COOLING COIL HEAT PUMP LOOP COLD DECK HEAT PUMP LOOP RETURN RELOCATED RETURN GRILLE OR REGISTER CONDENSATE DRAIN HEAT PUMP LOOP SUPPLY CFCI CONTRACTOR FURNISHED, CONTRACTOR INSTALLED RETURN AIR CFH CUBIC FEET PER HOUR HEATING RETURN AIR TEMPERATURE CFM CUBIC FEET PER MINUTE HEATING VENTILATING RAIN CONDUCTOR HEATING, VENTILATING, AIR CONDITIONING CHILLER RADIANT CEILING PANEL CHILLED WATER CHW ROOF DRAIN HOT WATER HEATING CHWR CHILLED WATER RETURN HOT WATER HEATING RETURN REQUIRED CHWS CLG CNDS CNDS (__# CHILLED WATER SUPPLY HOT WATER HEATING SUPPLY ROOF EXHAUST FAN COOLING DOMESTIC HOT WATER RETURN FAN CONDENSATE DOMESTIC HOT WATER (SPECIFIC TEMP *F) RELATIVE HUMIDITY CONDENSATE (SPECIFIC PSIG) DOMESTIC HOT WATER RETURN RLFA REERIGEARNT LIQUID CLEAN OUT HEAT EXCHANGER REVOLUTIONS PER MINUTE RPM CO2 CARBON DIOXIDE REFRIGERANT SUCTION CONTINUATION OR CONTINUED CONT ROOFTOP UNIT CONTR CONTRACTOR INDOOR AIR QUALITY CONVECTOR INSIDE DIAMETER CONV COEFFICIENT OF PERFORMACE SUPPLY AIR DIFFUSER OR GRILLE INVERT ELEVATION INTAKE HOOD SOUND ATTENUATOR CIRCULATING PUMP CRU CSS CONDENSATE RETURN UNIT INCHES SUPPLY AIR INFRARED HEATER SANITARY WASTE CLINICAL SERVICE SINK COOLING TOWER INDIRECT WASTE SUPPLY AIR TEMPERATURE SECTION CABINET UNIT HEATER DOMESTIC COLD WATER JANITOR'S CLOSET CONDENSER WATER RETURN JOCKEY PUMP SHOWER CONDENSER WATER SUPPLY KILOWATT SNOW MELT RETURN DRIP AND TRAP KILOWATT-HOUR SNOW MELT SUPPLY DISCHARGE AIR STATIC PRESSURE DISCHARGE AIR TEMPERATURE LEAVING AIR TEMPERATURE SPECIFICATION SPRINKLER DRY BULB LABORATORY LAVATORY SQUARE FOOT/SQUARE FEET DIRECT DIGITAL CONTROL START/STOP DEGREE POUNDS LEAVING DRY BULB SERVICE SINK DRAINAGE FIXTURE UNITS DIAMETER LOW LIMIT STORM LOW PRESSURE CONDENSATE STANDARD DAMPER DAY/NIGHT LOW PRESSURE STEAM STACK LOCKED ROTOR AMPS STEAM DOWNSPOUT NOZZLE STEAM (SPECIFIC PSIG LEAVING WET BULB DUCT SILENCER LEAVING WATER TEMPERATURE SUMMER WINTER SWITCH DRAIN TILE MIXED AIR DRAIN TILE CONNECTION TRANSFER GRILLE MIXED AIR TEMPERATURE DOMESTIC WATER HEATER TEMPERATURE CONTROL MAKE-UP AIR UNIT TEMPERING COIL MAXIMUM THOUSAND BRITISH THERMAL UNITS PER HOUR TEMPERATURE CONTROL PANEL EXHAUST GRILLE OR REGISTER TRENCH DRAIN MEDICAL COMPRESSED AIR **TEMPERATURE** MINIMUM CIRCUIT AMPACITY EXHAUST AIR TEMPORARY MOTOR CONTROL CENTER ENTERING AIR TEMPERATURE MECHANICAL TERMINAL HEATING EXPANSION COMPENSATOR **MEZZANINE** TOTAL HEAT ABSORBED ELECTRIC CABINET UNIT HEATER MANUFACTURER TERMINAL HEATING RETURN ENTERING DRY BULB MANHOLE TOTAL HEAT REJECTED **ENERGY EFFICIENCY RATIO** MINIMUM TERMINAL HEATING SUPPL' **MISCELLANEOUS** TOTAL STATIC PRESSURE EMERGENCY EYE WASH / SHOWER MILLION BRITISH THERMAL UNITS PER HOUR EMERGENCY EYE WASH (AIR) TERMINAL UNIT EXHAUST FAN TURNING VANES MOTOR STARTER EFFICIENCY MOUNTED **TYPICAL** ELECTRIC HEATING COIL MOTOR EXPANSION JOINT MANUAL AIR VENT UNIT HEATER ELEVATION MEDICAL VACUUM UNDERWRITER'S LABORATORY ELECTRICAL UON UNLESS OTHERWISE NOTED **ENERGY MANAGEMENT SYSTEM** NITROGEN NITROUS OXIDE UNIT VENTILATOR ENERGY RECOVERY LOOP NOISE CRITERIA **ENERGY RECOVERY LOOP RETURN** ERLS VALVE VENT **ENERGY RECOVERY LOOP SUPPLY** NORMALLY CLOSED NORMALLY CLOSED TIMED CLOSED ENERGY RECOVERY UNIT VACUUM EMERGENCY SHOWER NORMALLY CLOSED TIMED OPEN ESP EXTERNAL STATIC PRESSURE NATIONAL FIRE PROTECTION ASSOCIATION VARIABLE AIR VOLUME ELECTRIC UNIT HEATER NORMALLY OPEN TIMED CLOSED VACUUM BREAKER VOLUME DAMPER (MANUALLY ADJUSTABLE) ENTERING WET BULB NORMALLY OPEN TIMED OPEN ELECTRIC WATER COOLER NOT IN CONTRACT VARIABLE FREQUENCY CONTROLLER ENTERING WATER TEMPERATURE NORMALLY OPEN VENT THROUGH ROOF NOMINAL NON POTABLE COLD WATER VENTURI TERMINAL UNIT FIRE PROTECTION VERTICAL UNIT VENTILATOR DEGREES FAHRENHEIT FACE AND BYPASS FLOAT AND THERMOSTATIC WASTE AND VENT FACE AREA WET BULB FAN COIL UNIT WATER CLOSET WATER COLUMN WATER GAUGE WALL HYDRANT WATER PRESSURE DROP WEIGHT XFMR TRANSFORMER

TEMPERATURE CONTROL - PARTIAL SYMBOLS LIST

SYMBOL DESCRIPTION

CO2 CARBON DIOXIDE SENSOR

OS OCCUPANCY SENSOR

CO CARBON MONOXIDE SENSOR

DPT DIFFERENTIAL PRESSURE TRANSMITTER

SP STATIC PRESSURE SENSOR OR PROBE

FM FLOW METER

GUARD FOR STAT OR SENSOR

H HUMIDISTAT OR HUMIDITY SENSOR

(AS DEFINED ON TC DRAWINGS)

PT PRESSURE TRANSMITTER

SP STATIC PRESSURE SENSOR OR PROBE

VALVE - 2 WAY CONTROL VALVE

THERMOSTAT OR TEMPERATURE SENSOR

(AS DEFINED ON TC DRAWINGS)

NOTE: LIST OF ADDITIONAL SYMBOLS & ABBREVIATIONS ASSOCIATED WITH TEMPERATURE CONTROLS ARE IDENTIFIED ON TC DRAWINGS.

### MECHANICAL SYMBOL LIST

VALVE - OS&Y HORIZONTAL STEM

VALVE - OS&Y VERTICAL STEM

<u>PING SYMBO</u>	<u>LS</u>	DUCTWORK SY	<u>/MBOLS</u>
<u>MBOL</u> Даv	<u>DESCRIPTION</u>	<u>SYMBOL</u>	<u>DESCRIPTION</u>
wv <del>L</del>	AIR VENT — AUTOMATIC  AIR VENT — MANUAL	TU-101	AIR TERMINAL UNIT
BFP BFP	BACKFLOW PREVENTER	<u> </u>	AIR TERMINAL UNIT WITH HEATING COIL
	CATCH BASIN	<u> </u>	VENTURI AIR TERMINAL UNIT
$$ $\bigcirc$	CIRCULATING PUMP	<u> </u>	VENTURI AIR TERMINAL UNIT WITH HEATING COIL
	CLEAN OUT - IN FLOOR	<u>VTU−101</u>	
——II ——▶——I	CLEAN OUT — FLANGE DIRECTION OF FLOW		DAMPER — HORIZONTAL FIRE (EXISTING, NEW)
	DIRECTION OF PITCH — DOWN	0	DAMPER - HORIZONTAL FIRE / SMOKE (EXISTING, NEW)
	FINNED TUBE RADIATION	^_	DAMPER - SMOKE (EXISTING, NEW)
ď,	FIRE PROTECTION — SIAMESE CONNECTION — FREE STANDING	^_	DAMPER - VERTICAL FIRE (EXISTING, NEW)
<del></del>	FIRE PROTECTION — SIAMESE CONNECTION — WALL MOUNTED FIRE PROTECTION — SPRINKLER HEAD, CONCEALED	_& _ <b>*</b>	DAMPER - VERTICAL FIRE / SMOKE (EXISTING, NEW)
<b>—</b>	FIRE PROTECTION — SPRINKLER HEAD, PENDANT	BDD	DAMPER - BACK DRAFT
	FIRE PROTECTION — SPRINKLER HEAD, UPRIGHT	l M∕	
$\longrightarrow$	FIRE PROTECTION - SPRINKLER HEAD, SIDEWALL	Τ	DAMPER — MOTORIZED
j <b>⊙</b> ✓	FLOOR DRAIN		DAMPER - VOLUME (MANUALLY ADJUSTABLE)
<b>∀</b>	FLOOR DRAIN — ELEVATION FLOOR DRAIN — FUNNEL	<b>TO</b>	DIFFUSER - BLANK OFF
~	FLOOR DRAIN — FUNNEL, ELEVATION	<del></del>	DIFFUSER - LINEAR SLOT
<b>Y</b>	FLOW MEASURING DEVICE (FOR TEST AND BALANCING)		DIFFUSER — SQUARE OR RECTANGULAR
' □ □FS □ □FM	FLOW SWITCH		
LHB	FLOW METER HOSE BIBB		DUCT CROSS SECTION — SUPPLY
MH	MANHOLE		DUCT CROSS SECTION - RETURN
	OPEN SITE DRAIN		DUCT CROSS SECTION — EXHAUST
<del></del>	PIPE - ANCHOR		DUCT — FLEXIBLE CONNECTION
<del></del> 3	PIPE - CAP OR PLUG	<u> </u>	
<b></b> ⇒	PIPE — ELBOW DOWN	<del></del>	DUCT — FLEXIBLE DUCT
—○ <del></del>	PIPE — ELBOW UP PIPE — EXPANSION JOINT OR COMPENSATOR	<del>\ \ \</del>	DUCT TAKE-OFF - ROUND CONICAL
<del></del>	PIPE - FLANGE	<del>√</del> ¥ →	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
<del></del>	PIPE - HOSE AND BRAID FLEXIBLE CONNECTION	<u> </u>	ELBOW — RECTANGULAR WITH TURNING VANES
— <del>                                    </del>	PIPE - RUBBER FLEXIBLE CONNECTION	<u></u>	
<u> </u>	PIPE — GUIDE PIPE — TEE DOWN	j	ELBOW - RECTANGULAR/ ROUND SMOOTH RADIUS
<u>Ū</u>	PIPE - TEE UP	$\hookrightarrow$	ELBOW DOWN - RECTANGULAR
—	PIPE - UNION	$\hookrightarrow$	ELBOW DOWN - ROUND
$\mathbb{Q}^{\frac{1}{T}^{P/T}}$	PRESSURE AND TEMPERATURE TEST PLUG	<b>├</b> ─────────────────────────	ELBOW UP - RECTANGULAR
<u></u>	PRESSURE GAUGE AND COCK		
<b>─</b> D──	REDUCER - CONCENTRIC	<u> </u>	ELBOW UP - ROUND
	REDUCER — ECCENTRIC		FAN – AXIAL
<del></del> ©	ROOF/OVERFLOW DRAIN STEAM TRAP — FLOAT AND THERMOSTATIC		FAN - CENTRIFUGAL (ELEVATION)
_ <u></u>	— STEAM TRAP — BUCKET	<b>└</b>	HEATING COIL
<del></del>	STRAINER	, D ,	
	STRAINER WITH VALVE AND BLOW-OFF	<del>) 171 )</del>	INCLINED DROP IN DIRECTION OF AIRFLOW
<u> </u>	THERMOMETER	<del>∫                                    </del>	INCLINED RISE IN DIRECTION OF AIRFLOW
—∞ ——∞	TRAP		INTAKE OR RELIEF HOOD
<u> </u>	VALVE - ANGLE	<b>√</b>	REGISTER - RETURN OR EXHAUST
—ф—	VALVE - BALL		REGISTER — RETURN WITH BOOT
—//—— -5	VALVE — BUTTERFLY	<u> </u>	
——这 _{0.5} —	VALVE - BALANCE (i.e. BALANCE VALVE TO 0.5 GPM)		REGISTER - TRANSFER GRILLE
—————————————————————————————————————	VALVE — COMBINATION BALANCE & FLOW MEASURING (i.e. BALANCE VALVE TO 0.5 GPM)	(	ROOF EXHAUST FAN
<b>9</b> 01	VALVE — CHECK  VALVE — SPRING CHECK	$\leftarrow$	TRANSITION - CONCENTRIC
<b>→</b> Ø	VALVE - SPRING CHECK  VALVE - GAS (MANUAL)		TRANSITION — ECCENTRIC
—¤—	VALVE - GLOBE	, <del>_</del> ,	
—⋈——	VALVE - ISOLATION	Щ <del>→</del>	UNIT HEATER — HORIZONTAL THROW
<b>─</b> ₩──	VALVE — NEEDLE		UNIT HEATER — VERTICAL THROW
<u>\$</u>	VALVE - OS&Y		DUCTWORK SYMBOLS
——  <b>▽</b>  ———	VALVE — PLUG	<u>SYMBOL</u>	<u>DESCRIPTION</u>
——×——	VALVE - PRESSURE REGULATING	<del></del>	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
———— →	VALVE — PRESSURE REDUCING	<u> </u>	
	VALVE - PRESSURE RELIEF	1	DUCT TAKE-OFF - ROUND CONICAL
<u>\$</u>	VALVE - PRESSURE & TEMPERATURE RELIEF	لها ا	ELBOW — RECTANGULAR WITH TURNING VANES
──© ^{VTR}	VENT THROUGH ROOF		ELBOW - RECTAINGULAR WITH TURNING VAINES
<del> </del> _₩H	WALL HYDRANT		ELBOW - RECTANGULAR SHORT RADIUS WITH SPLITTER VANE
OUBLE LINE F	PIPING SYMBOLS		
IBOL	<u>DESCRIPTION</u>		ELBOW — ROUND
	FLANGE		ELBOW - RECTANGULAR SMOOTH RADIUS
	FLEX CONNECTION	, T	
	STRAINER - BASKET	\[ \times \]	ELBOW DOWN - RECTANGULAR
	STRAINER - Y TYPE		ELBOW DOWN — ROUND
	VALVE - 2 WAY CONTROL		
	VALVE - 3 WAY CONTROL	<del> </del>	ELBOW UP - RECTANGULAR
			ELBOW UP - ROUND
	VALVE — BUTTERFLY	<b>├ ■</b> →	HEATING COIL
	VALVE - CHECK	<del>- ■</del>	
	VALVE - DETECTOR CHECK	<u> </u>	INCLINED DROP IN DIRECTION OF AIRFLOW
<del></del>		R R	INCLINED RISE IN DIRECTION OF AIRFLOW
//\		<b>├</b>	

TRANSITION - CONCENTRIC

TRANSITION - ECCENTRIC

#### MECHANICAL DRAWING INDEX

SHEET NO. SHEET TITLE

MO.1 MECHANICAL STANDARDS AND DRAWING INDEX

MD1.1 LOWER LEVEL AND FIRST FLOOR MECHANICAL DEMOLITION PLANS

SECOND FLOOR MECHANICAL DEMOLITION PLAN
LOWER LEVEL AND FIRST FLOOR MECHANICAL PLANS

M2.1 LOWER LEVEL AND FIRST FLOOR MECHAN M2.2 SECOND FLOOR MECHANICAL PLAN

M6.1 MECHANICAL DETAILS
M6.2 MECHANICAL DETAILS
M7.1 MECHANICAL SCHEDUL

M7.1 MECHANICAL SCHEDULES
M7.2 MECHANICAL SCHEDULES

TEMPERATURE CONTROL STANDARDS AND GENERAL NOTES

M8.2 TEMPERATURE CONTROLS
M8.3 TEMPERATURE CONTROLS

### STANDARD METHODS OF NOTATION

SUPPLY DIFFUSER WITH SCHEDULE TAG "1", 10" DIAMETER NECK SIZE 10ø 350-4 350 CFM TYPICAL FOR 4 RETURN REGISTER WITH SCHEDULE TAG "1", R-1 22"x 22" NECK SIZE 22x22 640 CFM TYPICAL FOR 2 640-2 EXHAUST REGISTER E DESIGNATION SIMILAR. AIR TERMINAL UNIT WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN VENTURI AIR TERMINAL WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN

DUCT SIZE NOTATION ALL SIZES IN INCHES

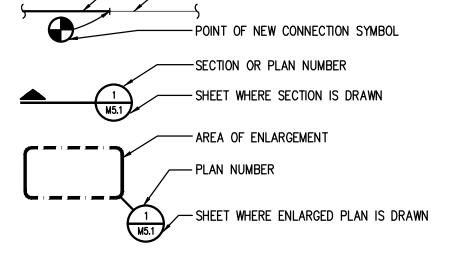
OVAL DUCT
RECTANGULAR DUCT
CONSTRUCTION NOTE NUMBER

EQUIPMENT DESIGNATION,
(i.e. EXHAUST FAN NUMBER 1)

PIPING RISER DESIGNATION
(i.e. HOT WATER RISER NUMBER 1)

NEW SYSTEM COMPONENT

EXISTING SYSTEM COMPONENT TO REMAIN



SECTION OR PLAN NUMBER

SECTION OR ENLARGED PLAN

M5.1

SHEET WHERE SECTION IS CUT OR

ENLARGED PLAN IS REFERENCED

HEAVY LINE WEIGHT INDICATES NEW WORK

LIGHT LINE WEIGHT INDICATES EXISTING
EQUIPMENT OR REFERENCED INFORMATION

GRAY LINE INDICATES BACKGROUND INFORMATION

DASHED LINES INDICATE PIPING

ROUTED BELOW SLAB OR GRADE

HATCH MARKS INDICATE EQUIPMENT OR MATERIALS
TO BE DISCONNECTED AND REMOVED.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.



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Administration
Building Upgrades

Plymouth-Canton Community Schools

MECHANICAL STANDARDS
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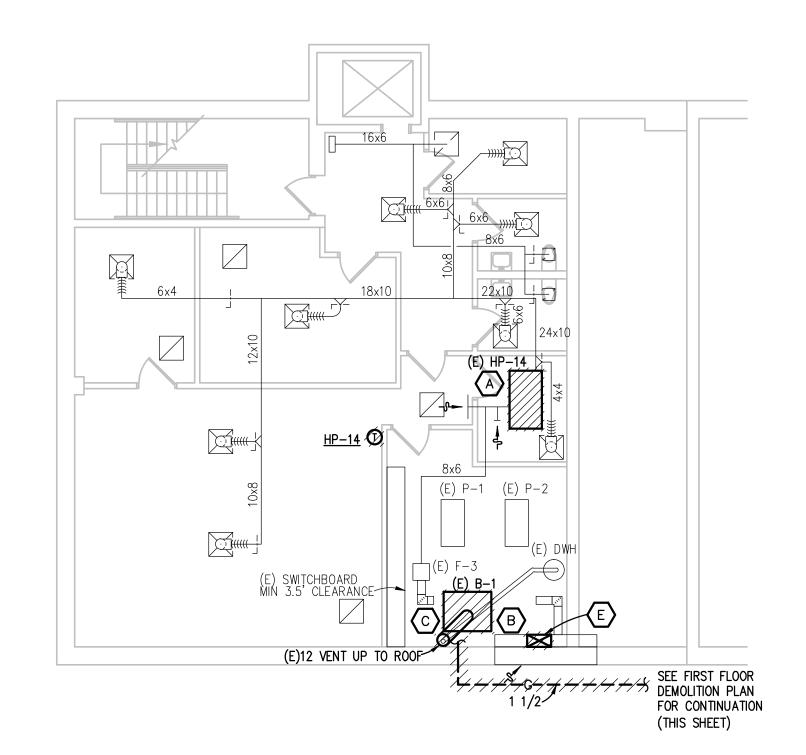
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FIRST FLOOR MECHANICAL DEMOLITION PLAN
SCALE: 1/8" - 1" - 0"





LOWER LEVEL MECHANICAL DEMOLITION PLAN
SCALE: 1/8" - 1' - 0"



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### **#** DEMOLITION KEY NOTES:

A. REMOVE EXISTING HEAT PUMP AND PIPING CONNECTIONS IN ORDER TO BE REPLACED. SHEET METAL TO REMAIN. PREPARE PIPING AND SHEET METAL FOR NEW CONNECTIONS.

MECHANICAL GENERAL DEMOLITION NOTES:

PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.

BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO

2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE

3. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.

4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL

WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE

- B. REMOVE EXISTING BOILER, ACCESSORIES, AND CONTROLS IN ORDER TO BE REPLACED.
- C. REMOVE EXISTING BOILER FLUE AND VENT TO ROOF.

OPEN ENDED PIPES AND DUCTWORK.

THE ENGINEER.

- D. REMOVE EXISTING INLINE FAN AND DUCTWORK AS INDICATED. PREPARE REMAINING DUCTWORK FOR NEW CONNECTION TO NEW FAN.
- E. REMOVE EXISTING COMBUSTION AIR DUCT AND DAMPER FROM EXISTING LOUVER AND BLANK OFF OPENING.

PRIOR TO DEMOLITION
THE TESTING AND BALANCING CONTRACTOR SHALL PROVIDE FLOW MEASUREMENTS FOR HEATING SYSTEM AND RECORD HEAD PRESSURES FOR THE EXISTING CIRCULATION PUMP(S). HEATING SYSTEM MUST BE PLACED IN A SIMULATED FULL LOAD, WHEN TAKING THE WATER FLOW MEASUREMENTS.

PROVIDE AIRFLOW READINGS FOR ALL DIFFUSERS/GRILLES, HEAT PUMPS AND

DEMOLITION WORK MUST NOT BEGIN, UNTIL THE TESTING AND BALANCING CONTRACTOR IS COMPLETE WITH RECORDING PRE—CONSTRUCTION WATER AND AIR FLOWS INDICATED ABOVE.

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PROJECT TITLE

## Administration **Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE LOWER LEVEL AND FIRST FLOOR MECHANICAL **DEMOLITION PLANS** 

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SECOND FLOOR MECHANICAL DEMOLITION PLAN
SCALE: 1/8" - 1" - 0"



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Administration
Building Upgrades

Plymouth-Canton
Community Schools

SECOND FLOOR
MECHANICAL DEMOLITION
PLAN


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1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.

2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK ACTUAL POLITING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT.

MECHANICAL GENERAL DEMOLITION NOTES:

WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT
DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES
BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO

THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
 ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

### **#** DEMOLITION KEY NOTES:

- A. REMOVE EXISTING HEAT PUMP AND PIPING CONNECTIONS IN ORDER TO BE REPLACED. SHEET METAL TO REMAIN. PREPARE PIPING AND SHEET METAL FOR NEW CONNECTIONS.
- B. REMOVE EXISTING BOILER, ACCESSORIES, AND CONTROLS IN ORDER TO BE
- C. REMOVE EXISTING BOILER FLUE AND VENT TO ROOF.

THE ENGINEER.

- D. REMOVE EXISTING INLINE FAN AND DUCTWORK AS INDICATED. PREPARE REMAINING DUCTWORK FOR NEW CONNECTION TO NEW FAN.
- E. REMOVE EXISTING COMBUSTION AIR DUCT AND DAMPER FROM EXISTING LOUVER AND BLANK OFF OPENING.

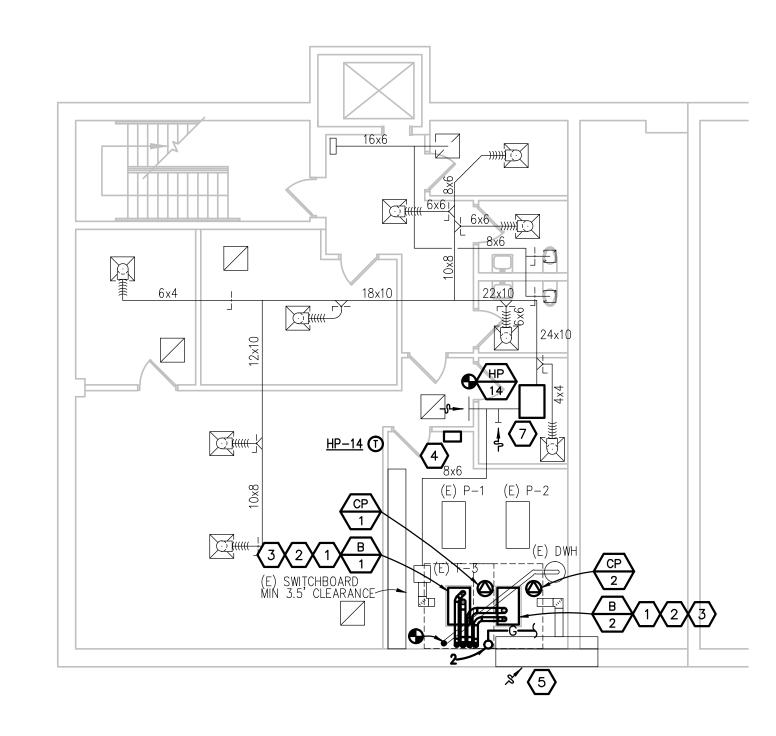
PRIOR TO DEMOLITION
THE TESTING AND BALANCING CONTRACTOR SHALL PROVIDE FLOW
MEASUREMENTS FOR HEATING SYSTEM AND RECORD HEAD PRESSURES FOR
THE EXISTING CIRCULATION PUMP(S). HEATING SYSTEM MUST BE PLACED IN
A SIMULATED FULL LOAD, WHEN TAKING THE WATER FLOW MEASUREMENTS.

PROVIDE AIRFLOW READINGS FOR ALL DIFFUSERS/GRILLES, HEAT PUMPS AND FANS

DEMOLITION WORK MUST NOT BEGIN, UNTIL THE TESTING AND BALANCING CONTRACTOR IS COMPLETE WITH RECORDING PRE-CONSTRUCTION WATER AND AIR FLOWS INDICATED ABOVE.



FIRST FLOOR MECHANICAL NEW WORK PLAN





LOWER LEVEL MECHANICAL NEW WORK PLAN

### **#** CONSTRUCTION KEY NOTES:

- NEW CONDENSING BOILER. PROVIDE AND INSTALL FLUE SIDE CONDENSATE NEUTRALIZER AS SPECIFIED. RE-USE OR EXTEND EXISTING PAD AS REQUIRED TO ACCOMMODATE NEW BOILER(S).
- 2. 4" DIAMETER (AL294C STAINLESS STEEL, FOR CATEGORY IV BOILERS) FLUE STACK UP TO FIRST FLOOR AND THROUGH WALL IN ARCHITECTURAL ENCLOSURE. REFER TO DETAILS AND PROVIDE MANUFACTURER'S RECOMMENDED TERMINATION CAP. COORDINATE ROUTING WITH EXISTING CONDITIONS AND KEEP WALL PENETRATIONS AT LEAST 12" APART.
- 3. INSULATED 5" DIAMETER (STAINLESS STEEL) COMBUSTION AIR INTAKE PIPE UP TO FIRST FLOOR AND THROUGH WALL IN ARCHITECTURAL ENCLOSURE. ROUTE COMBUSTION AIR INTAKE AND EXHAUST FLUE PER 2006 INTERNATIONAL FUEL GAS CODE AND PER MANUFACTURERS RECOMMENDATIONS. LOCATE COMBUSTION AIR TERMINATION MIN 3 FT UNDER THE FLUE VENT TERMINATION. KEEP WALL PENETRATIONS AT LEAST 12" APART.
- 4. EMERGENCY SHUT OFF SWITCH FOR BOILERS.
- 5. CLOSE UNUSED PORTIONS OF EXISTING LOUVER. SEE DETAILS FOR SPECIFIED METHOD OF BLANK OFF.
- 6. NEW HORIZONTAL HEAT PUMP. PLACE NEW UNIT AS CLOSE TO POSSIBLE TO LOCATION OF EXISTING UNIT. PROVIDE NEW UNIT CONTROLS. LOCATE ROOM TEMPERATURE SENSOR IN SAME LOCATION AS EXISTING REMOVED SENSOR. PROVIDE NEW PIPING AND DUCTWORK AS REQUIRED TO RECONNECT UNIT. PROVIDE NEW UNIT HANGERS. WHEN BALANCING NEW UNIT DISTRIBUTE DIFFERENCE OF AIRFLOW BETWEEN NEW AND OLD HEAT PUMP EVENLY THROUGHOUT ASSOCIATED DIFFUSERS. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REINSTALLING ALL CEILINGS REQUIRED FOR THEIR WORK. MECHANICAL CONTRACTOR SHALL REPLACE ALL DAMAGED TILES.
- 7. NEW VERTICAL HEAT PUMP. PLACE NEW UNIT AS CLOSE AS POSSIBLE TO LOCATION OF EXISTING UNIT. PROVIDE NEW EQUIPMENT PAD OR EXTEND EXISTING EQUIPMENT PAD WHERE NECESSARY. PROVIDE NEW UNIT CONTROLS. LOCATE ROOM TEMPERATURES SENSOR IN SAME LOCATION AS EXISTING REMOVED SENSOR. PROVIDE NEW PIPING AND DUCTWORK AS REQUIRED TO RECONNECT UNIT. WHEN BALANCING NEW UNIT DISTRIBUTE DIFFERENCE OF AIRFLOW BETWEEN NEW AND OLD HEAT PUMP EVENLY THROUGHOUT ASSOCIATED DIFFUSERS
- 8. NEW OA DUCT. CONNECT TO HEAT PUMP RETURN AIR AS INDICATED.
- 9. NEW 2 GAS PIPE FROM METER UNDERGROUND TO MECHANICAL ROOM. PENETRATE EXTERIOR WALL ABOVE GRADE AND DROP TO MECHANICAL ROOM THROUGH MECHANICAL CHASE. REFER TO GAS PIPING DIAGRAM FOR EXTENT OF PIPING WORK AND TO FIND REQUIRED PIPING ACCESSORIES.
- 10. EXTEND NEW 4" DWH FLUE VENT TO ROOF. CONTRACTOR TO COORDINATE SIZE WITH EXISTING DWH.

### PLUMBING GENERAL NOTES:

- 1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
- 2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- 3. PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
- 4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- 5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL
- 6. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF PLUMBING FIXTURES.
- 7. HOT AND COLD WATER PIPING RUN-OUTS TO LAVATORIES AND SINKS SHALL BE 1/2" UNLESS OTHERWISE NOTED.
- PLUMBING VENT PIPING THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10'-0" FROM ANY FRESH AIR INTAKE LOCATION AND A MINIMUM OF 18" CLEAR FROM THE INSIDE FACE OF PARAPET.
- PROVIDE CODE REQUIRED CLEARANCE FOR ALL CLEANOUTS INSTALLED IN SANITARY WASTE AND VENT PIPING.
- 10. MINIMUM UNDERGROUND PIPE SIZE SHALL BE 3".
- 11. WATER SERVICE ENTRANCE PIPING SHALL BE BURIED WITH DEPTH OF COVER OVER TOP OF PIPE OF AT LEAST 72", OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.

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- 7. COORDINATE LOCATION OF DUCT-MOUNTED HYDRONIC DEVICES WITH SHEET METAL TRADES
- 8. BRANCH PIPING SERVING TERMINAL UNIT HEATING COILS OR RADIANT CEILING PANELS SHALL BE 3/4" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING MORE THAN ONE TERMINAL UNIT HEATING COIL SHALL BE 1" UNLESS OTHERWISE NOTED. BRANCH PIPING SERVING HOT WATER UNIT HEATERS AND CABINET UNIT HEATERS SHALL BE 1" UNLESS OTHERWISE NOTED.
- 9. MOUNT THERMOSTATS 48" A.F.F., UNLESS OTHERWISE NOTED. LOCATE AS CLOSE AS POSSIBLE TO DOOR WHEN INDICATED NEAR DOOR. COORDINATE EXACT LOCATION WITH ALL OTHER TRADES.

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ARCHITECTURE

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PROJECT TITLE

# Administration Building Upgrades

Plymouth-Canton Community Schools

LOWER LEVEL AND FIRST FLOOR MECHANICAL PLANS

01-19-2017 BIDS

DATE: ISSUED FOR:

CHECKED GRN

DRAWN **ZAV** 

APPROVED RNR

PROJECT NO. 13089E

DRAWING NO.

M2.1

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SECOND FLOOR MECHANICAL PLAN

### **#** CONSTRUCTION KEY NOTES:

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   NEUTRALIZER AS SPECIFIED. RE-USE OR EXTEND EXISTING PAD AS REQUIRED TO
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- 2. 4" DIAMETER (AL294C STAINLESS STEEL, FOR CATEGORY IV BOILERS) FLUE STACK UP TO FIRST FLOOR AND THROUGH WALL IN ARCHITECTURAL ENCLOSURE. REFER TO DETAILS AND PROVIDE MANUFACTURER'S RECOMMENDED TERMINATION CAP. COORDINATE ROUTING WITH EXISTING CONDITIONS AND KEEP WALL PENETRATIONS AT LEAST 12" APART.
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A R C H I T E C T U R E

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Administration
Building Upgrades

Plymouth-Canton Community Schools

DRAWING TITLE
SECOND FLOOR
MECHANICAL PLAN

ISSUE DATES	

01–19–2017 BIDS

DATE: ISSUED FOR:

DRAWN ZAV

CHECKED GRN

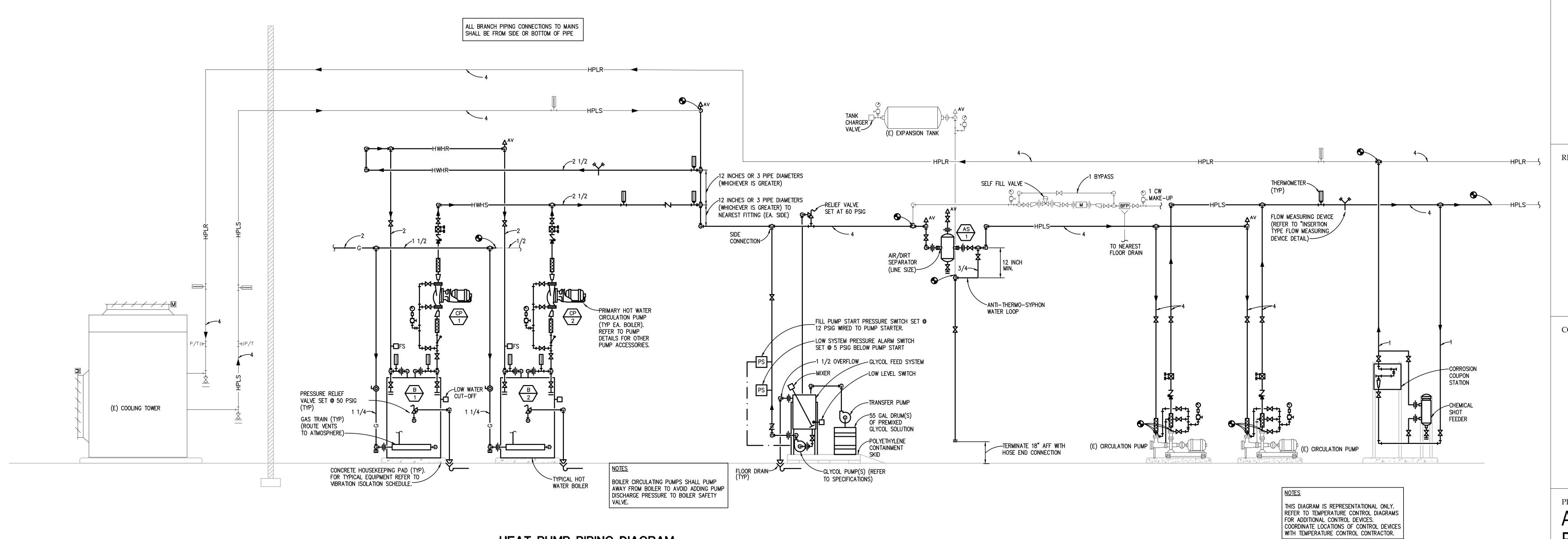
APPROVED RNR

PROJECT NO.

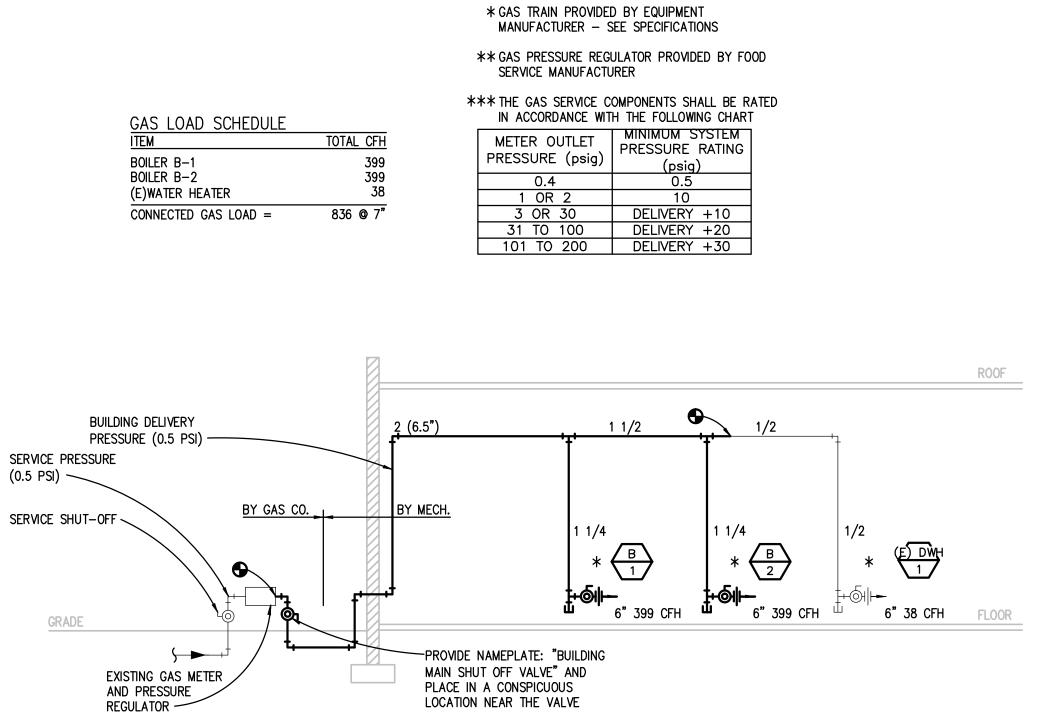
13089E

DRAWING NO.

M2.2



HEAT PUMP PIPING DIAGRAM
NO SCALE



NATURAL GAS PIPING DIAGRAM NO SCALE



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Administration
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MECHANICAL DETAILS

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DATE:	ISSUED FOR:
DATE:	

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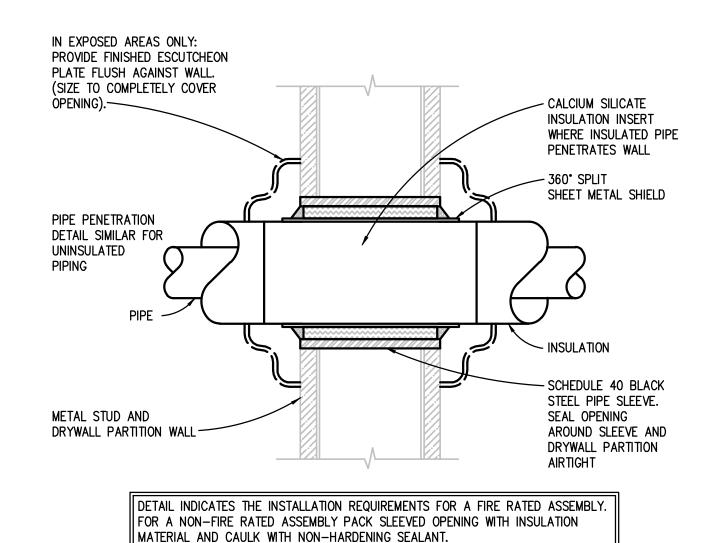
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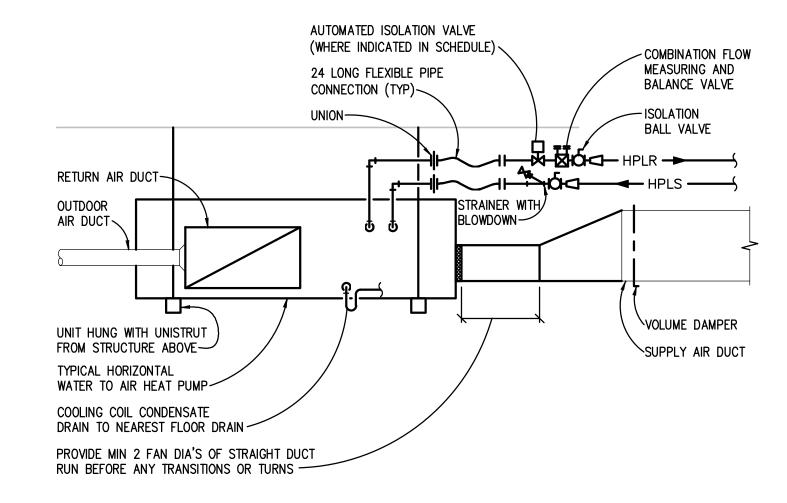
DRAWING NO.

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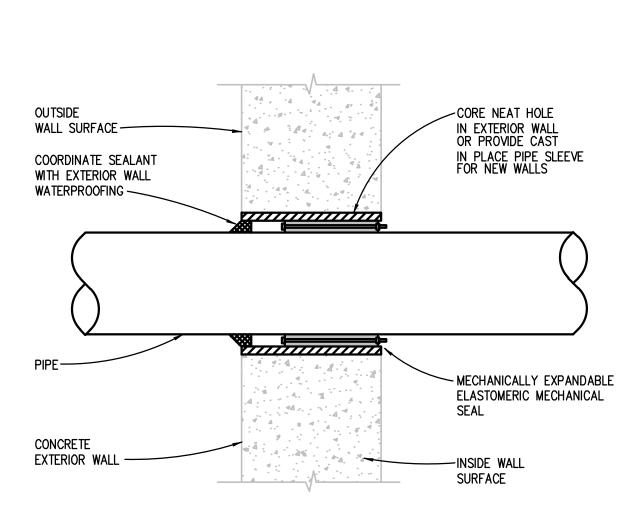
### FIRE RATED AND NON-FIRE RATED POURED CONCRETE OR BLOCK WALL PIPE PENETRATION DETAIL NO SCALE



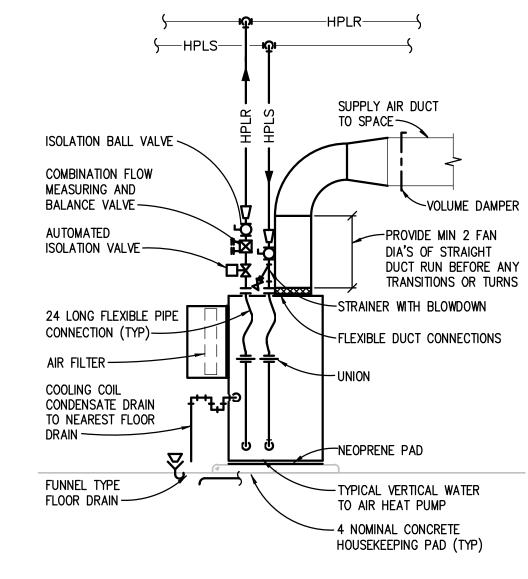
FIRE RATED AND NON-FIRE RATED METAL STUD AND DRYWALL PARTITION WALL PIPE PENETRATION DETAIL



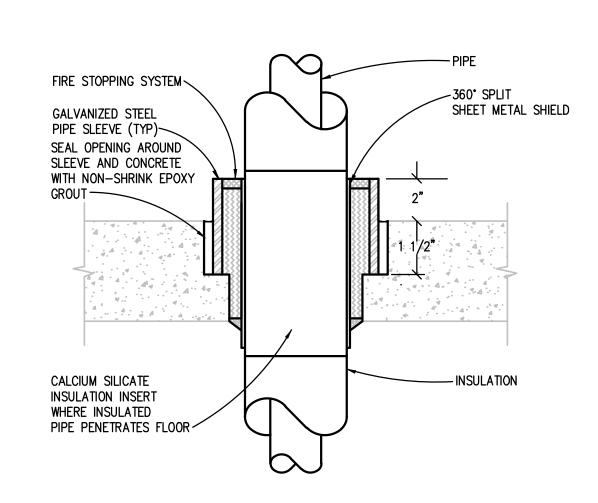
HORIZONTAL HEAT PUMP PIPING DIAGRAM AND INSTALLATION DETAIL



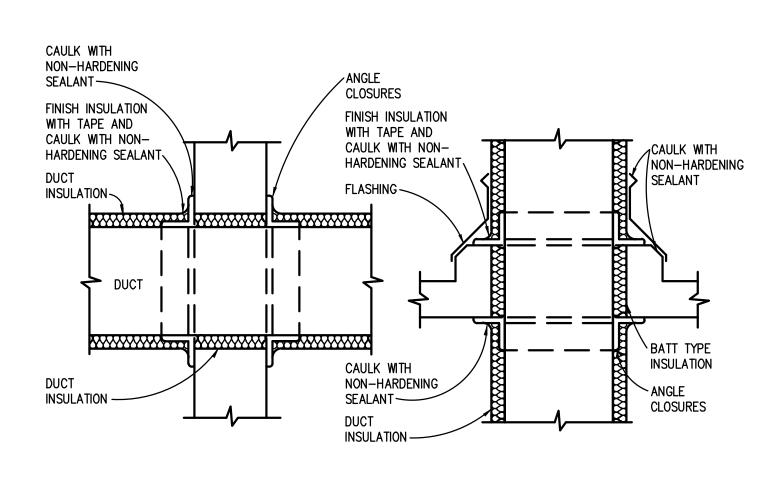
EXTERIOR BELOW GRADE WALL PIPE PENETRATION DETAIL



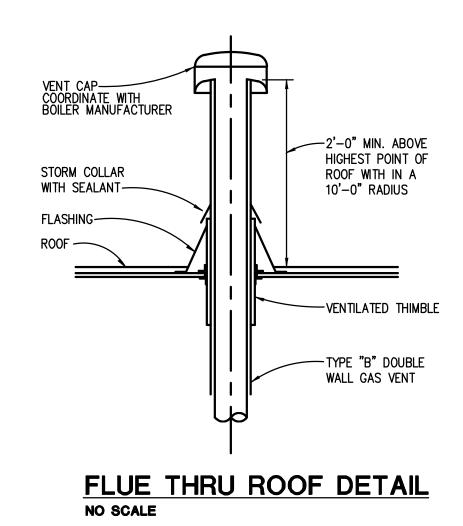
VERTICAL HEAT PUMP PIPING DIAGRAM AND INSTALLATION DETAIL NO SCALE



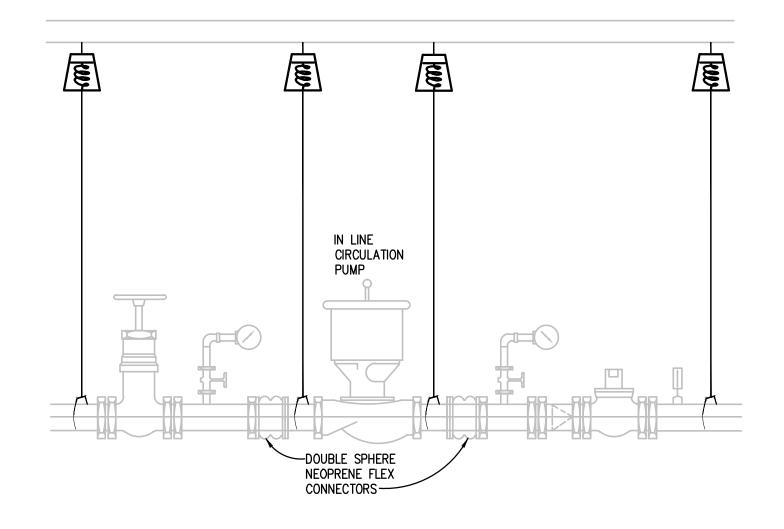
EXISTING FLOOR PIPE PENETRATION DETAIL



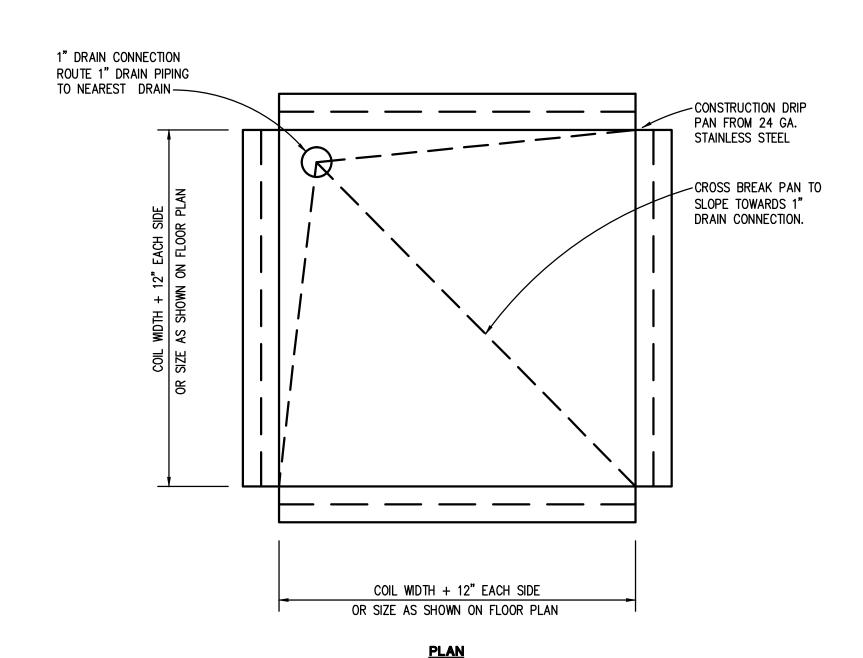
VERTICAL OR HORIZONTAL (NON FIRE RATED ASSEMBLY) DUCT PENETRATION DETAIL

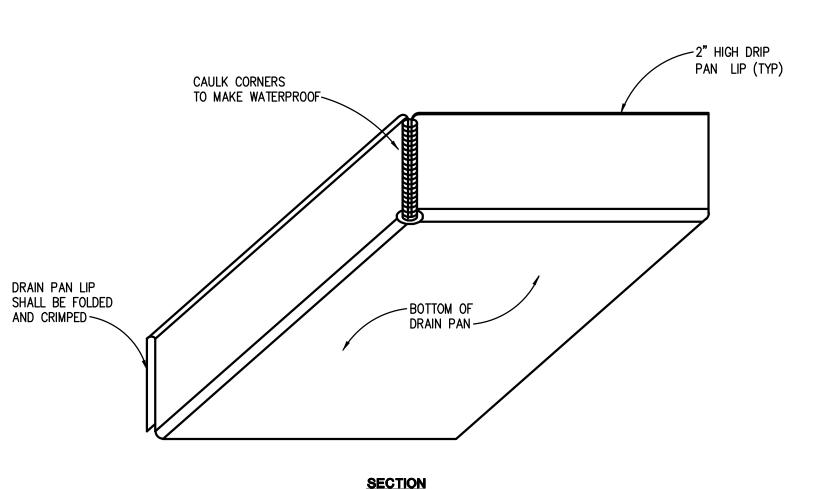


PIPING SHALL BE SUPPORTED ON 2" STATIC DEFLECTION SPRING AND NEOPRENE VIBRATION ISOLATION HANGERS AS PER THE SPECIFICATION WITHIN THE EQUIPMENT ROOM, OR FOR A DISTANCE OF 50 FEET FROM THE EQUIPMENT, WHICHEVER IS GREATER.



IN-LINE PUMP ISOLATION DETAIL NO SCALE





ELECTRICAL EQUIPMENT OVER HEAD DRIP PAN DETAIL



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PROJECT TITLE

## Administration **Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE MECHANICAL DETAILS

ISSUE DATES	


01-19-2017 BIDS ISSUED FOR:

DRAWN BG CHECKED SC

APPROVED GJZ

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DRAWING NO.

M6.2

ABOVEGROUND HVAC PIPE &	AC SCH				Y	INS	UL	AT.	'IOI	N A	<b>\</b> PF	PLIC	CA	TION
	IN	ISULAT		ATERIAI INCHES		HCKNES	SS	FIEL	D-APF	PLIED	JACKET	MATE	RIAL	
	FLEXIBLE ELASTOMERIC	FIBERGLASS	MINERAL WOOL	POLYISOCYANURATE	PHENOLIC	CELLULAR GLASS	CALCIUM SILICATE	ALUMINUM	STAINLESS STEEL	PVC	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	PVDC (INDOOR)	PVDC (OUTDOOR)	KEYED NOTES
INDOOR PIPE SYSTEM AND SIZE (INCHES)														
HEAT PUMP LOOP SUPPLY & RETURN	1	1						Х		Х				Α
HEATING HOT WATER SUPPLY & RETURN 200 DEG F AND LOWER														
3 AND SMALLER		1						Х		Χ				Α
4 AND LARGER		1.5						Х		Х				Α
GENERAL NOTES	-													

- 1. 'X' OR THICKNESS IN INCHES INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED, CONTRACTOR MAY SELECT FROM
- 2. INSULATE PIPING WITHIN AIR HANDLING EQUIPMENT THE SAME AS INDOOR PIPING. PROVIDE ALUMINUM OR STAINLESS STEEL JACKET.
- <u>KEYED NOTES</u>
- A. PROVIDE FIELD APPLIED JACKET FOR PIPING EXPOSED IN EQUIPMENT ROOMS, STORAGE ROOMS, JANITORS CLOSETS, RECEIVING ROOMS, TEST AREAS, CIRCULATION
- AREAS AND SUCH AREAS SUBJECT TO DAMAGE WITHIN 10 FEET (3 METERS) OF FINISHED FLOOR.
- B. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL INSULATION. C. STEAM AND CONDENSATE PIPING JACKET SHALL BE STUCCO EMBOSSED.
- D. PIPING WITHIN ENERGY RECOVERY UNITS SHALL BE TYPE 304 STAINLESS STEEL, SMOOTH; 0.010 INCH THICK. SEAMS AND JOINTS CAULKED WITH CHEMICALLY RESISTANT

			М	ATERIA	<b>NL</b>						CONNE	ECTION				ISC	DLATION	VAL\	/ES	
PIPE SIZE (INCHES) <b>HEATING HOT W</b>	SOFT COPPER TYPE K	HARD COPPER TYPE L	# HARD COPPER TYPE M	CARBON STEEL (SCHED. 40)	CARBON STEEL (SCHED. 80)	CARBON STEEL (STD.)	SOPPER TYPE DWV	SOLDERED	BRAZED	MELDED WELDED	THREADED	Langed Flanged	GROOVED GROOVED	PRESSURE SEAL	MECHANICALLY FORMED TEE	TIV8 G F	GENERAL SERVICE BUTTERFLY	HI-PERF BUTTERFLY	GATE	KEYED NO
		Χ						Х	Х					Х	Х	Х				
UP TO 2				_						Х		Х	Х				χ			D
UP TO 2 2-1/2 TO 4				х						^										
				X						Х		Х	Х				Х			D
2-1/2 TO 4 6 TO 8	P - M	IN. W	ORKIN	Х	ESS.	& TE	MP.: 1	25 PS	SIG A	Х	DEG	Х	Х				Х			D
2-1/2 TO 4	P - M	IN. W	ORKIN	Х	ESS.	& TE	MP.: 1	25 P\$	SIG A	Х	DEG	Х	Х	X	X	Х	Х			D
2-1/2 TO 4 6 TO 8 HEAT PUMP LOO	P - M		ORKIN	Х	RESS.	& TE	MP.: 1			Х	DEG	Х	X	Х	Х	X	X			D A

- 1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A PIPING SYSTEM, CONTRACTOR MAY
- SELECT FROM THOSE INDICATED SELECTIONS. 2. DISSIMILAR-METAL PIPING JOINTS: CONSTRUCT JOINTS USING DIELECTRIC FITTINGS COMPATIBLE WITH BOTH PIPING MATERIALS. IF A BRONZE VALVE CONNECTS THE DISSIMILAR METALS NO FURTHER DIELECTRIC ISOLATION IS REQUIRED.
  - a. NPS 2 AND SMALLER: USE BRASS COUPLING, NIPPLE, OR UNION.
- b. NPS 2-1/2 AND LARGER: USE DIELECTRIC FLANGE KITS. 3. USE UNIONS OR FLANGES AT VALVE AND EQUIPMENT CONNECTIONS.
- 4. HVAC EQUIPMENT DRAINS, VENTS, SAFETY VALVE PIPING, BLOWDOWN PIPING AND THE LIKE SHALL BE SAME PIPING MATERIAL AS ASSOCIATED
- 5. GROOVED END VALVES MAY BE USED WITH GROOVED PIPING.
- <u>KEYED NOTES</u>
- A. GROOVED FITTINGS, JOINTS, AND COUPLINGS, IF INDICATED AS AN ACCEPTABLE SELECTION, MAY BE USED IN ACCESSIBLE LOCATIONS FOR THIS PIPING SYSTEM ONLY.
- B. BALL VALVE WITH 250 PSIG STEAM TRIM. C. BALL VALVE WITH 150 PSIG STEAM TRIM.
- D. GROOVED FITTINGS, JOINTS AND COUPLINGS MAY BE USED IN MECHANICAL ROOMS ONLY.

HORIZONTAL PIPING	<u> </u>	<u> </u>	7 5	<u> </u>	PC	)P1	ΓΔ	PP	ו וכ	: A TION
				JLE		/ I 1 1		AI I		
	ŀ	IANGEF	R OR S	SUPPOR	RT TYP	E	SH	ELD T	YPE	
METAL PIPE TYPE & SIZE	MSS TYPE 1 CLEVIS HANGER	MSS TYPE 10 SWIVEL RING BAND HANGER	MSS TYPE 41 DOUBLE ROD PIPE ROLLER	MSS TYPE 43 SINGLE ROD ROLLER HANGER	MSS TYPE 44 PIPE ROLLER & STAND	MSS TYPE 46 ADJUSTABLE PIPE ROLL STAND	MSS TYPE 39 PROTECTION SADDLE	MSS TYPE 40 INSULATION PROTECTION SHIELD	THERMAL—HANGER SHIELD	KEYED NOTES
UNINSULATED SINGLE PIPE										
UP TO 2 INCH		X								
2-1/2 INCH TO 4 INCH 6 INCH TO 8 INCH		Х								
INSULATED SINGLE COLD PIPES			<u> </u>	<u> </u>						
UP TO 2 INCH	Х	х						х	Х	A
2-1/2 INCH TO 4 INCH	Х								Х	
6 INCH TO 8 INCH	Х								Х	
INSULATED SINGLE HOT PIPES		-		<u> </u>		-		-		
UP TO 2 INCH	Х	Х					Х	Х	Х	A, C
2-1/2 INCH TO 4 INCH			Х	Х	Х	Х	Х		Х	B, C
6 INCH TO 8 INCH			Х	Х	Χ	Х	Χ		Х	B, C

### GENERAL NOTES

- 1. "X" INDICATES APPROVED HANGER OR SUPPORT ELEMENTS. IF MORE THAN ONE HANGER OR SUPPORT ELEMENT
- IS INDICATED, SELECTION FROM APPROVED ELEMENTS IS CONTRACTOR'S OPTION. REFER TO HANGER AND SUPPORT SECTION FOR APPROVED MANUFACTURERS.
- . HANGERS AND SUPPORTS USED FOR FIRE PROTECTION SERVICES SHALL BE UL LISTED OR FMG APPROVED. 4. HANGER ELEMENTS IN CONTACT WITH BARE COPPER PIPE SHALL BE COPPER PLATED, PLASTIC COATED, FELT
- LINED, OR USE MANUFACTURED COPPER TUBE ISOLATORS. REFER TO INDIVIDUAL PIPING SPECIFICATION SECTIONS FOR HANGER SPACING.
- 6. MULTIPLE PARALLEL COLD PIPES MAY BE TRAPEZE SUPPORTED FROM BELOW USING U-BOLTS OR STRUT CLAMPS AND THERMAL HANGER SHIELDS. REFER TO KEYED NOTE A. 7. MULTIPLE PARALLEL COLD PIPES MAY BE TRAPEZE SUPPORTED FROM ABOVE USING STANDARD HANGER ELEMENTS
- INDICATED FOR SINGLE COLD PIPES. 8. MULTIPLE PARALLEL HOT PIPES MAY BE TRAPEZE SUPPORTED FROM BELOW USING ROLLER ELEMENTS AND
- THERMAL HANGER SHIELD OR INSULATION PROTECTION SADDLE. REFER TO KEYED NOTES B AND C.
- 9. MULTIPLE PARALLEL HOT PIPES MAY BE TRAPEZE SUPPORTED FROM ABOVE USING STANDARD ROLLER HANGERS INDICATED AND THERMAL HANGER SHIELD OR INSULATION PROTECTION SADDLE. REFER TO KEY NOTES B AND 10. REFER TO INDIVIDUAL PIPING SPECIFICATION SECTIONS FOR ADDITIONAL SYSTEM SPECIFIC HANGER APPLICATIONS.

### KEYED NOTES

A. USE THERMAL HANGER SHIELD ON TRAPEZE SUPPORTED INSULATED PIPE TO PREVENT CRUSHING OF INSULATION. B. USE THERMAL HANGER SHIELD DESIGNED FOR USE ON ROLLER SUPPORTS FOR INSULATED HOT PIPE . C. USE TYPE 39 PROTECTION SADDLES IF INSULATION WITHOUT VAPOR BARRIER IS INDICATED. FILL INTERIOR VOIDS WITH INSULATION MATCHING ADJOINING INSULATION.

DUCT SYSTEM INSULATION	APP	LIC	AT	101	<b>N</b> S	SCH	HE	DUL	E.	
	IN	ISULAT		ATERIAL (INCHES		HICKNE	SS	<b>A</b> P	ield Plied	
						[ET			CKET TERIAL	
	FIBERGLASS BLANKET 0.75 LB/CU FT	FIBERGLASS BLANKET 1.0 LB/CU FT	FIBERGLASS BOARD 2.25 LB/CU FT	FIBERGLASS BOARD 6.0 LB/CU FT	FLEXIBLE ELASTOMERIC	ASTM E2336 2-HOUR FIRE RATED BLANKET	2—HOUR FIRE RATED BLANKET	ALUMINUM	SELF—ADHESIVE (FOR OUTDOOR APPLICATIONS)	keyed notes
DUCT SYSTEMS LOCATED INDOORS										
SUPPLY AIR, EXCEPT AS NOTED BELOW		1.5								Α
RECTANGULAR SUPPLY AIR IN MECHANICAL ROOMS			1.5							
RETURN AIR IN UNVENTED ATTICS ABOVE INSULATED CEILINGS		1.5								
RETURN AIR IN UNVENTED ATTICS ABOVE INSULATED CEILINGS (WHERE IECC APPLIES)		2								
RECTANGULAR RETURN AIR IN MECHANICAL EQUIPMENT ROOMS			1.5							
ROUND RETURN AIR IN MECHANICAL ROOMS		1.5								
OUTSIDE AIR AND MIXED AIR, EXCEPT AS NOTED BELOW		1.5								
RECTANGULAR OUTSIDE AIR AND MIXED AIR IN MECHANICAL ROOMS			1.5							
ROUND OUTSIDE AIR AND MIXED AIR IN MECHANICAL ROOMS		1.5								
OUTSIDE AIR INTAKE, RELIEF AIR AND EXHAUST AIR PLENUMS ADJACENT TO EXTERIOR LOUVERS  PLENUMS, DUCTS, AND DUCT ACCESSORIES NOT REQUIRING INSULATION:			1.5							

- FIBROUS-GLASS DUCTS DOUBLE-WALL METAL DUCTS WITH INSULATION OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2007
- METAL DUCTS WITH DUCT LINER OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 2007 EXPOSED SUPPLY DUCT IN CONDITIONED SPACE SERVED BY THAT SYSTEM
- FABRIC SUPPLY DUCTS FACTORY-INSULATED FLEXIBLE DUCTS
- FACTORY-INSULATED PLENUMS AND CASINGS FLEXIBLE CONNECTORS
- VIBRATION-CONTROL DEVICES FACTORY-INSULATED ACCESS PANELS AND DOORS

### GENERAL NOTES

- 1. 'X' OR THICKNESS IN INCHES INDICATE ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
- 2. REFER TO METAL DUCT SECTION OF SPECIFICATIONS FOR DUCT LINING AND DOUBLE-WALL INSULATED DUCT. 3. REFER TO HVAC CASINGS SECTION OF SPECIFICATIONS FOR DOUBLE-WALL INSULATED PLENUMS.

### KEYED NOTES

- A. INCLUDE INSULATION AROUND DUCT MOUNTED COILS AND AIR TERMINAL UNIT COILS. B. NUMBER OF LAYERS AND TOTAL INSULATION THICKNESS AS RECOMMENDED BY SELECTED MANUFACTURER.
- C. DOES NOT APPLY TO PREFABRICATED, ZERO-CLEARANCE GREASE DUCT. D. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL DUCT INSULATION.
- E. INSULATE DUCTWORK IN CRAWLSPACES, VENTILATED ATTICS, AND PARKING GARAGES HAVING NATURAL OR MECHANICAL VENTILATION THE SAME AS OUTDOOR DUCTWORK.

### SCHEDULES GENERAL NOTES:

#### TYPICAL FOR ALL SCHEDULE SHEETS:

- 1. REFER TO ELECTRICAL STANDARD SCHEDULES, ONE LINE DIAGRAM AND PANEL SCHEDULES FOR ADDITIONAL ELECTRICAL INFORMATION
- 2. PROVIDE THE FOLLOWING FACTORY-WIRED ELECTRICAL OPTIONS/ACCESSORIES WHERE INDICATED IN SCHEDULE:
  - A NON-FUSED DISCONNECT SWITCH
- B UNIT SHALL BE SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND
- C SERVICE RECEPTACLE
- D FUSED DISCONNECT SWITCH
- E COMBINATION STARTER F - UNIT SHALL HAVE (2) SINGLE POINT CONNECTIONS WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS. (1) CONNECTION SHALL BE FOR CONDENSING SECTION AND (1) CONNECTION SHALL BE FOR THE REMAINDER OF THE UNIT.
- 3. FOR MODULATION/CONTROL TYPE COLUMN, "VFC" INDICATES VARIABLE FREQUENCY CONTROLLERS, "AUTO" INDICATES AUTOMATIC OPERATION (CONTROLLED BY TEMPERATURE CONTROLS OR SELF CONTAINED CONTROLS), "MANUAL" INDICATES HAND OPERATION.
- 4. IF VARIABLE FREQUENCY CONTROLLERS ARE INDICATED TO BE PROVIDED AND ARE NOT INSTALLED INTEGRAL TO THE UNIT, VARIABLE FREQUENCY CONTROLLERS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR (UNLESS OTHERWISE NOTED) AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE LINE SIDE AND LOAD SIDE WIRING TO THE MOTOR AND INCLUDING MISCELLANEOUS STEEL REQUIRED FOR THE SUPPORT AND MOUNTING OF THE VFC. REFER TO FLOOR PLANS FOR LOCATION.
- 5. WHERE EQUIPMENT IS INDICATED TO HAVE A SINGLE POINT ELECTRICAL CONNECTION, THAT EQUIPMENT SHALL COME COMPLETE WITH FACTORY INSTALLED STARTERS, MOTOR OVERLOAD PROTECTION, CONTACTORS, FUSING AND ALL NECESSARY INTERNAL WIRING AND CONTROLS. PROVIDE A FACTORY MOUNTED UNIT DISCONNECTING MEANS WHERE THE ELECTRICAL CONTRACTOR SHALL MAKE SINGLE POINT CONNECTION. INSTALL PACKAGED EQUIPMENT SUCH THAT THE ELECTRICAL CONNECTION AND CONTROLS ARE ACCESSIBLE AND HAVE CLEARANCES MEETING THE NATIONAL ELECTRICAL CODE.
- 6. WHERE PACKAGED EQUIPMENT IS PROVIDED, NAMEPLATE MUST INDICATE MAXIMUM OVERCURRENT PROTECTION BY HACR RATED CIRCUIT BREAKERS OR FUSES. IF FUSE PROTECTION ONLY IS INDICATED, PROVIDE A FUSIBLE DISCONNECT AND FUSES WITH
- . WHERE EQUIPMENT IS DESIGNATED BY MANUFACTURER AND MODEL NUMBER, THIS IS THE BASIS OF DESIGN. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT BY OTHER SPECIFIED MANUFACTURERS OR PROPOSED ALTERNATE EQUIPMENT BY THE BASIS OF DESIGN MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS TO ELECTRICAL REQUIREMENTS, STRUCTURAL LOADING, OR ARCHITECTURAL APPURTENANCES AND SHALL INCLUDE THE COST OF SUCH REVISIONS IN HIS BID.
- 8. WHERE EQUIPMENT IS SCHEDULED TO INCLUDE A SERVICE RECEPTACLE, PROVIDE A FACTORY MOUNTED SERVICE RECEPTACLE WITH APPROPRIATE FUSES AND TRANSFORMERS CONNECTED ON THE LINE SIDE OF THE UNIT DISCONNECT. PROVIDE A NAMEPLATE ON THE DISCONNECT SWITCH INDICATING THE PRESENCE OF LIVE POWER TO THE SERVICE RECEPTACLE WHEN HE UNIT DISCONNECT IS IN THE OFF
- 9. SIZE ALL EQUIPMENT FEEDERS BASED ON THE LISTED MOP (MAXIMUM OVERCURRENT PROTECTION). REFER TO THE FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE ON THE ELECTRICAL STANDARD SCHEDULES SHEET.

MECHANICAL EQUIPMENT INSULATION	NC	ΑP	PL	IC <i>A</i>	\TI(	NC	S	CHE	ΞDI	JLE
	IN.	ISULAT	ION MA	TERIAL INCHES		IICKNES	SS	FIE APP JAC		
		TANK						MATE		
	FLEXIBLE ELASTOMERIC	FIBERGLASS, LARGE DIAMETER PIPE &	FIBERGLASS BOARD	POLYISOCYANURATE	PHENOLIC	CELLULAR GLASS	CALCIUM SILICATE	ALUMINUM	DAC	KEYED NOTES
DUAL-SERVICE HEATING AND COOLING PUMPS			2	1	2	3		Χ	Х	
HEAT RECOVERY PUMPS			2	1.5	1	2		Х	Х	
STEAM CONDENSATE & BOILER FEEDWATER PUMPS		2	2			3	3	Х	Х	
DOMESTIC HOT, COLD, AND CHILLED WATER HYDROPNEUMATIC TANKS	1	1	1	1	1	1.5				Α
CHILLED WATER, CLOSED LOOP CONDENSER WATER, DUAL—SERVICE HEATING AND COOLING WATER, AND HEAT RECOVERY WATER AIR SEPARATORS	1	1	1	1	1	2		Х	Х	A
HEATING WATER AIR SEPARATORS		2	2			3	3	Х	Х	

### **GENERAL NOTES**

- 1. 'X' OR THICKNESS IN INCHES INDICATE ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A SYSTEM, CONTRACTOR MAY SELECT FROM 2. REFER TO SPECIFICATIONS FOR FACTORY INSULATED EQUIPMENT.
- KEYED NOTES
- A. FIELD APPLIED JACKETS NOT REQUIRED FOR FLEXIBLE ELASTOMERIC INSULATION. B. SELECT INSULATION THICKNESS TO PROVIDE MINIMUM R-VALUE OF 12.5.

DUC	T S	SYS	STE	M	AP	PL	ICA	TIC	NC	SC	CHE	EDI	JLE					
						D	UCT M	ATERIA	L									
AIR SYSTEMS	G90 GALV. SHEET METAL	DOUBLE-WALL LINED G90 GALY. SHEET METAL (SOLID INNER WALL)	DOUBLE—WALL LINED G90 GALV. SHEET METAL (PERF. INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	GALVANNEALED SHEET METAL	ALUMINUM	TYPE 304 STAINLESS STEEL	TYPE 316 STAINLESS STEEL	PVC COATED GALV. SHEET METAL (4X1)	PVC COATED GALV. SHEET METAL (1X4)	PVC COATED GALV. SHEET METAL (4X4)	16 GA. CARBON STEEL	ZERO-CLEARANCE PREFABRICATED RANGE HOOD EXHAUST DUCT	FABRIC	DESIGN PRESSURE CLASS (INCHES WG)	SEAL CLASS	MAX. ALLOWABLE LEAKAGE RATE (PERCENT)	KEYED NOTES
SUPPLY AIR WITHOUT TERMINAL UNITS	Х														+2	Α	5	
RETURN AIR WITHOUT TERMINAL UNITS	Х														-2	Α	5	
EXHAUST AIR WITHOUT TERMINAL UNITS	Х														-2	Α	5	
AIR TRANSFER DUCT				Х											+2	Α	5	
OUTSIDE AIR AND MIXED AIR DUCT	Х														-6	Α	5	
OUTSIDE AIR, RELIEF AIR AND EXHAUST AIR PLENUMS ADJACENT TO EXTERIOR LOUVERS		Х													+/-6	A	5	

### **GENERAL NOTES**

- 1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS. 2. 4 X 1 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON EXTERIOR SHEET METAL SURFACES OF
- DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON INTERIOR SURFACES.
- 3. 1 X 4 (4 X 1 REVERSE COATED) PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON INTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON EXTERIOR SURFACES.
- 4. 4 X 4 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND 4 MILS (0.10 MM) THICK ON OPPOSITE SURFACES.

### KEYED NOTES

A. SCREWS, DAMPERS, OR PROJECTIONS OF ANY TYPE ON INTERIOR OF DUCT SURFACE ARE PROHIBITED. B. DUCT SHALL BE LINED WITHIN 25 FEET UPSTREAM OF FANS.

C. ALL WELDED CONSTRUCTION.



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PROJECT TITLE Administration **Building Upgrades** 

Plymouth-Canton **Community Schools** 

DRAWING TITLE MECHANICAL SCHEDULES

ISSUE DATE	ES	

01-19-2017	BIDS
DATE:	ISSUED FOR:

DRAWN BG CHECKED SC APPROVED GJZ

PROJECT NO.

DRAWING NO.

														1	WATE	R SOL	JRCE	HEA	T PL	JMP :	SCHE	EDUL	.E											
UNIT TYPE	NOMINAL SIZE		FAN			LOOP WAT	ER		COOLING N	MODE (85°F	ENT. WATER	R TEMP.)		_		DE (70°F ENT.				COMPRI					FIL	.TER				ELEC.	TRICAL		MODEL NO.	REMARKS
TIPE	(TONS)	AIRFLOW CFM	ESP IN. W.G.	HP	FLOW GPM	FLUID TYPI	FT. HEAD	E.A.T.	L.A.T.	TOTAL CAPACITY MBH	SENS. CAPICTY MBH	THR MBH	MINIMUM FULL LOAD E.E.R.	E.A.T.	AIR L.A.T. F	TOTAL CAPACITY MBH	THA MBH	MINIMUM C.O.P.	NO. OF COMP.	NUMBER OF STAGES	R.L.A. EA.	L.R.A. EA.	ARRANGEMENT	FILTER TYPE	MERV	CLEAN FILTER P.D.	DIRTY FILTER P.D.	VOLTS	PHASE	FLA	MOP	OPTIONS/ ACCESSORIES		
HP-A	1	340	0.4	1/10	3.0	PG30	11.57	75.0/63.0	53.5/51.3	11.1	7.9	14.0	13.1	70	111.4	15.2	12.1	4.8	1	1	4.7	25.0	HORIZONTAL	THROW AWAY	8	0.25	0.5	208	1	5.6	15		WGSH0121	
HP-B	1.5	440	0.4	1/3	3.8	PG30	7.03	75.0/63.0	53.9/51.6	14.0	10.1	17.1	15.4	70	110.3	19.3	15.6	5.3	1	1	5.6	29.0	HORIZONTAL	THROW AWAY	8	0.25	0.5	208	1	8.4	15		WGSH0151	
HP-C	2	700	0.4	1/3	6.0	PG30	6.56	75.0/63.0	52.0/50.7	23.9	17.5	29.2	15.5	70	107.7	28.7	22.9	5.0	1	2	11.7	58.3	HORIZONTAL	THROW AWAY	8	0.25	0.5	208	1	14.7	25		WGTH0261	
HP-D	2.5	1000	0.5	1/5	7.5	PG30	9.54	75.0/63.0	55.0/52.5	29.5	21.7	36.7	14.2	70	103.5	36.4	29.0	4.9	1	2	8.7	58.0	VERTICAL	THROW AWAY	8	0.25	0.5	208	3	13.7	20		WGTV0321	
HP-E	2.5	1000	0.6	1/2	7.5	PG30	9.54	75.0/63.0	55.0/52.5	29.5	21.7	36.7	14.2	70	103.5	36.4	29.0	4.9	1	2	8.7	58.0	HORIZONTAL	THROW AWAY	8	0.25	0.5	208	3	13.7	20		WGTH0321	
HP-F	3	940	0.6	1/2	9.0	PG30	12.18	75.0/63.0	51.4/49.4	35.0	23.8	42.6	15.8	70	113.0	43.8	35.3	5.1	1	2	11.6	73.0	HORIZONTAL	THROW AWAY	8	0.25	0.5	208	3	16.6	30		WGTH0381	
HP-G	4	1400	0.7	3/4	12.0	PG30	9.03	75.0/63.0	54.2/51.6	44.5	31.6	54.7	14.9	70	106.5	55.5	43.9	4.8	1	2	14.0	83.1	VERTICAL	THROW AWAY	8	0.25	0.5	208	3	21.3	35		WGTV0491	
HP-H	5	1750	0.7	1	15.0	PG30	13.82	75.0/63.0	53.5/51.2	57.5	40.8	70.3	15.3	70	109.4	74.9	59.1	4.7	1	2	16.5	110.0	VERTICAL	THROW AWAY	8	0.25	0.5	208	3	25.9	45		WGTV0641	

	AIR 8	DIRT SE	EPARA	TOR SCHEDULE	
INLET/OUTLET PIPE SIZE (INCHES)	MAX SYSTEM FLOW (GPM)	MAX PRESSURE DROP CLEAN (FT HD)	OPERATING WEIGHT (LBS)	TYPE	MODEL NUMBER
4	220	6.0	186	HIGH VELOCITY / AIR & DIRT	VHN 400 FA

NOTE:

1. MODEL NUMBERS ARE SPIROTHERM UNLESS OTHERWISE NOTED.

2. SEPARATOR FLANGE CONNECTION MUST BE A MINIMUM OF THE PIPE DIAMETER SIZE OF WHICH THE SEPARATOR IS INSTALLED.

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01-19-2017	BIDS
DATE:	ISSUED FOR:

DRAWN BG CHECKED SC APPROVED **GJZ** 

PROJECT NO.

DRAWING NO.

l	HEAT I	PUM	IP APPI	LICAT	ION S	CHEDU	LE
UNIT IDENTIFICATION	LOCATION	TYPE	AREA SERVED	AIR FLOW CFM	OUTSIDE AIR FLOW CFM	RETURN AIR FLOW CFM	REMARKS
HP-1	108	F	107	940	90	850	3-WAY VALVE
HP-2	108	С	109	700	70	630	3-WAY VALVE
HP-3	111	С	102	700	70	630	3-WAY VALVE
HP-4	112	D	120	1000	100	900	3-WAY VALVE
HP-5	136	Α	133	340	5	335	3-WAY VALVE
HP-6	112	Н	118	1750	155	1595	3-WAY VALVE
HP-7	112	Н	119	1750	155	1595	3-WAY VALVE
HP-8	205	F	206	940	135	805	3-WAY VALVE
HP-9	205	Е	206	1000	135	865	3-WAY VALVE
HP-10	209	G	219	1400	140	1260	3-WAY VALVE
HP-11	209	Н	219	1750	155	1595	3-WAY VALVE
HP-12	220	Α	224	340	5	335	3-WAY VALVE
HP-13	209	G	212	1400	140	1260	3-WAY VALVE

1750

3-WAY VALVE

3. FLUID TYPE: W = WATER, PGXX = PROPYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL, EGXX = ETHYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL.
4. INTERNAL STATIC PRESSURE VALUE SHALL INCLUDE WET COIL PRESSURE DROP, EXTERNAL PRESSURE INCLUDES DIRTY FILTER PRESSURE DROP AS SCHEDULED.

NOTE:

1. REFER TO SCHEDULES GENERAL NOTES.

1. REFER TO SCHEDULES GENERAL NOTES.

2. MODEL NUMBERS ARE DAIKIN UNLESS OTHERWISE NOTED

5. PROVIDE HEAT PUMP LOOP MOTORIZED ISOLATION VALVE.

	GAS FIRED CONDENSING BOILER SCHEDULE																				
UNIT IDENTIFICATION	NUMBER OF CONTROL	ſ	FUEL	AGA INPUT		CONDENSING			DIMENSIONS			WA	TER		MODULATION/ CONTROL TYPE		ELEC	CTRICAL		MODEL NUMBER	REMARKS
	STAGES	TYPE	INLET PRESSURE AT GAS TRAIN INCH W.C.	MBH	OUTPUT MBH	AGA OUTPUT MBH	PSIG	LENGTH	WIDTH	HEIGHT	E.W.T. F	L.W.T. F	FLOW GPM	W.P.D. FT		VOLTS	PHASE	FLA	OPTIONS/ ACCESSORIES		
B-1	5:1 TURNDOWN	NATURAL GAS	3.5–14	399	371	347	125	36.5	21	52	70	100	25	5	FULL MODULATION	120	1	<8		MACH CM-399	
B-2	5:1 TURNDOWN	NATURAL GAS	3.5-14	399	371	347	125	36.5	21	52	70	100	25	5	FULL MODULATION	120	1	<8>		MACH CM-399	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.

2. MODEL NUMBERS ARE PATTERSON—KELLEY UNLESS OTHERWISE NOTED.
3. PROVIDE BOILER WITH CONDENSATE NEUTRALIZATION TANK ASSEMBLY.

	PUMP SCHEDULE																		
UNIT IDENTIFICATION	SYSTEM SERVED	LOCATION	TYPE	COUPLING TYPE	WATERFLOW GPM	FLUID TYPE	COLDEST SYSTEM	PUMP HEAD FT.	OVERLOAD GPM	MINIMUM EFFICIENCY		MOTOR		MODULATION/ CONTROL TYPE		ELECTRICAL		MODEL NUMBER	REMARKS
							OPERATING TEMP. 'F FOR PUMP SELECTION			%	BHP	HP	RPM		VOLTS	PHASE	OPTIONS/ ACCESSORIES		
CP-1	BOILER B-1	BOILER ROOM	IN-LINE	CLOSE	25	PG30	100	15	NON- OVERLOADING	62.7	0.16	1/3	1725	AUTO	208	3		1.25AAB E-90	
CP-2	BOILER B-2	BOILER ROOM	IN-LINE	CLOSE	25	PG30	100	15	NON- OVERLOADING	62.7	0.16	1/3	1725	AUTO	208	3		1.25AAB E-90	

1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBER ARE BELL & GOSSETT UNLESS OTHERWISE NOTED.
3. FLUID TYPE: W = WATER, PGXX = PROPYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL, EGXX = ETHYLENE GLYCOL SOLUTION XX PERCENTAGE OF GLYCOL.

FAN SCHEDULE																																	
UNIT IDENTIFICATION	SYSTEM SERVED	TYPE	AIRFLOW T.S	.P. IN. W.G.	RPM	CLASS	ARRANGEMENT		М	OTOR		MODULATION/ CONTROL TYPE		ELECTRICA	AL							M	MAXIMUM SOUNI	) POWER LEVEL	.S							MODEL NUMBER	REMARKS
								BHP	HP	RPM	DRIVE TYPE		VOLTS	PHASE	OPTIONS/ ACCESSORIES		UNIT RADIATED LW BY OCTAVE BAND  UNIT INLET LW BY OCTAVE BAND																
																63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)	63 HZ (DB)	125 HZ (DB)	250 HZ (DB)	500 HZ (DB)	1000 HZ (DB)	2000 HZ (DB)	4000 HZ (DB)	8000 HZ (DB)		
IF-1	HEAT PUMPS	CENTRIFUGAL	300	0.5	1631	1	INLINE	0.06	1/10	1725	DIRECT	AUTO	120	1		71	77	66	57	54	51	46	41	70	75	72	63	59	57	52	45	SQ-85-VG	
IF-2	HEAT PUMPS	CENTRIFUGAL	450	0.15	1521	1	INLINE	0.04	1/10	1725	DIRECT	AUTO	120	1		62	73	64	55	53	50	48	39	61	71	70	61	58	56	54	43	SQ-85-VG	

NOTE:

1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE GREENHECK UNLESS OTHERWISE NOTED.

								ſ	PLl	JME	3IN	G	PIP	INC	3 8	ιV	AL	۷E	A	PPI	_IC	ΑT	101	N S	CH	<del>I</del> EC	UL	E.										
							M	IATERI <i>A</i>	۸L											PRESS	SURE (	CONNEC	CTIONS							AVITY NNECTI				ISOLA	TION V	/ALVES		
PIPE SIZE (INCHES)	SOFT COPPER TYPE K	HARD COPPER TYPE L	HARD COPPER TYPE M	CARBON STEEL (SCHED. 40)	CARBON STEEL (STD.)	GALV. STEEL (SCHED. 40)	PEX	PE PIPE	PE SHEATHED CARBON STEEL PIPE	CSST	NO-HUB CISP	PVC TYPE DWV	PP DRAINAGE PIPE	COPPER TYPE DWV	DUCTILE IRON PIPE	SOLDERED	BRAZED	WELDED	THREADED	FLANGED	GROOVED	INSERT & CRIMP	FUSION	PRESSURE-SEAL	MECHANICALLY—FORMED TEE	MECHANICAL JOINT	PUSH-ON-JOINT	SOLVENT WELDED	SOLDERED	FUSION	CISPI HUBLESS	HEAVY-DUTY HUBLESS	BALL	AGA BALL	GENERAL SERVICE BUTTERFLY	LUBRICATED PLUG	GATE	KEYED NOTES
ABOVEGROUND FUEL	gas ·	- MIN.	WOF	RKING	PRES	88. _' 1(	00 PS	IG																														
IP TO 2				Х														Х	Х															Х				Е
-1/2 TO 3				Х														Х		Х														Х				E
4 TO 10				Х														Х		Х																Х		E
2 AND LARGER					Х													Х		Х																Х		E
JNDERGROUND FUEL (	GAS -	MIN.	WOR	KING	PRES	SS.: 10	00 PS	ig .					•		•	•	•	•	•	•		•	•	•	•		•	•	•	•	•	•	•		•	•	•	
/2 TO 12								Х															Х															F
ALL SIZES									Х									Х																				

1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A PIPING SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.

2. DISSIMILAR-METAL PIPING JOINTS: CONSTRUCT JOINTS USING DIELECTRIC FITTINGS COMPATIBLE WITH BOTH PIPING MATERIALS.

a. NPS 2 AND SMALLER: USE DIELECTRIC NIPPLE/WATERWAY. b. NPS 2-1/2 AND LARGER: USE DIELECTRIC FLANGE KITS.

3. USE UNIONS OR FLANGES AT VALVE AND EQUIPMENT CONNECTIONS. 4. PLUMBING EQUIPMENT DRAINS, VENTS, SAFETY VALVE PIPING, BLOWDOWN PIPING AND THE LIKE SHALL BE SAME PIPING MATERIAL AS ASSOCIATED

5. GROOVED END VALVES MAY BE USED WITH GROOVED PIPING.

KEYED NOTES

A. GROOVED AND PRESSURE SEALED FITTINGS, JOINTS, AND COUPLINGS, IF INDICATED AS AN ACCEPTABLE SELECTION, MAY BE USED IN ACCESSIBLE LOCATIONS

ONLY FOR THIS PIPING SYSTEM.

B. JOINTS ARE NOT PERMITTED ON UNDERGROUND WATER PIPING.

D. INSTALL IN CONTAINMENT JACKET, REFER TO SPECIFICATIONS. E. USE STEEL WELDING FITTINGS AND WELDED JOINTS IN PLENUM CEILINGS. VALVES, FLANGES, OR UNIONS ARE PROHIBITED. F. NO JOINTS ALLOWED UNDERGROUND.

C. USE CAST IRON DRAINAGE PATTERN (DURHAM) FITTINGS.

### TEMPERATURE CONTROL - SYMBOLS LIST

HEMATIC S	YMBOLS	SCHEMATIC SYN	MBOLS (CONT.)	WIRING SYMBOI	LS (CONT.)
YMBOL	DESCRIPTION	<u>SYMBOL</u>	<u>DESCRIPTION</u>	<u>SYMBOL</u>	DESCRIPTION
<b>10</b>	AQUASTAT, STRAP ON BULB	DD	SMOKE DETECTOR — DUCT MOUNTED	H 0 A	
s	CURRENT SWITCH	SD	SMOKE DETECTOR - SPACE MOUNTED		SWITCH - 3 POSITION SELECTOR HAND/OFF/AUTO
<b>→</b>	DAMPER - OPPOSED BLADE	s/s	START/STOP RELAY	00	SWITCH — MANUAL SPST, NO
<del>////</del>	DAMPER - PARALLEL BLADE	SPT	STATIC PRESSURE TRANSMITTER		omitori winnone or or, the
м	DAMPER MOTOR	SP	STATIC PRESSURE SENSOR OR PROBE	0—0	SWITCH - MANUAL SPST, NC
PT	DIFFERENTIAL PRESSURE TRANSMITTER	sw	SWITCH	0	SWITCH — MANUAL SPDT
 PS	DIFFERENTIAL PRESSURE SWITCH		TEMPERATURE SENSOR - RIGID ELEMENT IN WELL	0	
ж	FIRE ALARM SYSTEM, ADDRESSABLE CONTROL MODULE		TEMPERATURE SENSOR — DUCT MOUNTED AVG ELEMENT	$\sim$	SWITCH - PRESSURE & VACUUM, NO
_ ~_~~	← FREEZESTAT		TEMPERATURE SENSOR — DUCT MOUNTED RIGID ELEMENT	- <u>-</u> -	SWITCH - PRESSURE & VACUUM, NC
	GUARD FOR STAT OR SENSOR	(T)	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)		SWITCH - TEMPERATURE ACTUATED, N
_ 		XF	TRANSFORMER	<u>-</u> -	SWITCH - TEMPERATURE ACTUATED, N
	HUMIDITY SENSOR, DUCT MOUNTED  LINE — ELECTRIC	Ø	VALVE - 2 WAY CONTROL VALVE	<del>-</del> x-	THERMAL OVERLOAD, SINGLE PHASE
	LINE — PNEUMATIC	<b>☆</b>	VALVE - 3 WAY CONTROL VALVE	0L'S \	
s	MOTOR STARTER	VFC	VARIABLE FREQUENCY CONTROLLER	M JHHK	THERMAL OVERLOAD CONTACTS - 3 P
_	OCCUPANCY CENCOR	WIRING SYMBOL		<u></u>	TRANSFORMER
s	OCCUPANCY SENSOR	<u>SYMBOL</u>	<u>DESCRIPTION</u>	o	WIRE TERMINATION AT DEVICE
	RELAY, ELECTRIC	—(M/S)—	COIL - MOTOR STARTER CONTACTOR	<del>-</del>	WIRE TO WIRE TERMINATION
)	SIGNAL - DDC/BAS, ANALOG INPUT		COIL — EP OR SOLENOID VALVE	<u>-</u>	WIRING NOT CONNECTED
9)	SIGNAL - DDC/BAS, ANALOG OUTPUT	<del></del>	CONTACT - INSTANT OPERATING, NO	'	
OI)	SIGNAL - DDC/BAS, DIGITAL INPUT	·\\•	CONTACT - INSTANT OPERATING, NC	WIRING TERMS  ABBREVIATION	<u>DESCRIPTION</u>
9	SIGNAL - DDC/BAS, DIGITAL OUTPUT	Ŷ	GROUND	SPST	SINGLE POLE SINGLE THROW
$\overline{}$	SIGNAL - PACKAGED EQUIPMENT, ANALOG INPUT	÷	GNOUND	SPDT	SINGLE POLE DOUBLE THROW
		6	MOTOR, SINGLE PHASE	DPST	DOUBLE POLE SINGLE THROW
<u> </u>	SIGNAL — PACKAGED EQUIPMENT, ANALOG OUTPUT	Y	mo rong officer range	DPDT	DOUBLE POLE DOUBLE THROW
<u> </u>	SIGNAL - PACKAGED EQUIPMENT, DIGITAL INPUT			NO	NORMALLY OPEN
	SIGNAL — PACKAGED EQUIPMENT, DIGITAL OUTPUT			NC	NORMALLY CLOSED

NOTE: REFER TO MECHANICAL STANDARDS ON DRAWING MO.1 FOR ADDITIONAL SYMBOLS & ABBREVIATIONS THAT MAY BE USED ON TEMPERATURE CONTROL DRAWINGS.

ABBREVIATION DESCRIPTION

ELECTRIC RADIANT CEILING PANEL

ENTERING WATER TEMPERATURE

FACE AND BYPASS DAMPER

**ENERGY RECOVERY UNIT** 

ELECTRIC UNIT HEATER

ENTERING WET BULB

DEGREES FAHRENHEIT

FIRE ALARM SYSTEM

FLOW MEASURING DEVICE

FINNED TUBE RADIATION

GALLONS PER MINUTE

**GRAVITY RELIEF HOOD** 

HEAT PUMP LOOP PUMP

HEATING VENTILATING

HOT WATER HEATING

DOMESTIC HOT WATER

INDOOR AIR QUALITY

JANITOR'S CLOSET

KILOWATT-HOUR

MIXED AIR

MAXIMUM

MECHANICAL

MANUFACTURER

MISCELLANEOUS

MOTOR STARTER

MANUAL AIR VENT

MOUNTED

MEZZANINE

POUNDS PER HOUR

MAKE-UP AIR UNIT

MIXED AIR TEMPERATURE

MOTOR CONTROL CENTER

THOUSAND BRITISH THERMAL UNITS PER HOUR

MILLION BRITISH THERMAL UNITS PER HOUR

OR TEMP SENSOR —

HEAT PUMP LOOP RETURN

HEAT PUMP LOOP SUPPLY

HOT WATER HEATING RETURN

HOT WATER HEATING SUPPLY

DOMESTIC HOT WATER RETURN

HEATING, VENTILATING, AIR CONDITIONING

HAND/OFF/AUTO

HORSEPOWER

HEATING

INCHES

FAN COIL UNIT

**ABBREVIATION LIST** 

AUTOMATIC AIR VENT

ACCESS DOOR

ALTERNATE

AIR COOLED CONDENSER

ABOVE FINISHED FLOOR

AIR HANDLING UNIT

AIR PRESSURE DROP

AIR COOLED CONDENSING UNIT

BUILDING AUTOMATION SYSTEM

CUBIC FEET PER MINUTE

CHILLED WATER PUMP

CHILLED WATER RETURN

CHILLED WATER SUPPLY

COMPUTER LOOP PUMP

CARBON DIOXIDE

CIRCULATING PUMP

CABINET UNIT HEATER

DOMESTIC COLD WATER

CONDENSER WATER PUMP CONDENSER WATER RETURN

CONDENSER WATER SUPPLY

DISCHARGE AIR TEMPERATURE

DRY BULB TEMPERATURE

DIRECT DIGITAL CONTROL

DOMESTIC WATER HEATER

ENTERING AIR TEMPERATURE

ELECTRIC CABINET UNIT HEATER

DIRECT EXPANSION

ENTERING DRY BULB

ELECTRIC HEATING COIL

EXHAUST AIR

EXHAUST FAN

EFFICIENCY

ELECTRICAL

COOLING TOWER

DISCHARGE AIR

DEGREES

DAY/NIGHT

DAMPER

DRAWING

CONDENSATE

CONVECTOR

CONTR

COMPUTER LOOP RETURN

COMPUTER LOOP SUPPLY

CONTINUATION OR CONTINUED

CENTRAL OPERATOR STATION

AMERICAN SOCIETY OF HEATING, REFRIGERATION

ABBREVIATION DESCRIPTION

### **GENERAL NOTES**

- 1. THESE GENERAL NOTES SHALL BE APPLICABLE FOR ALL TC DRAWINGS.
- 2. "PROVIDE" IS DEFINED AS "FURNISH AND INSTALL".
- 3. TC CONTRACTOR SHALL BE RESPONSIBLE TO COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.
- 4. FOR TEMPERATURE CONTROL DRAWINGS ONLY: ALL DETAILED INFORMATION IDENTIFIED WITH HEAVY LINE WEIGHT SHALL BE PROVIDED BY TC CONTRACTOR. ALL OTHER INFORMATION IDENTIFIED WITH LIGHT LINE WEIGHT SHALL BE PROVIDED BY OTHER
- 5. ALL CONTROL SCHEMATICS AND WIRING DIAGRAMS ARE FOR THE CLARIFICATION OF EQUIPMENT INTERLOCKING FUNCTIONS AND THE INTERFACE OF VARIOUS CONTRACTORS'S WORK AND SHALL NOT BE MISTAKEN AS SHOP DRAWINGS FOR ACTUAL INSTALLATION.
- 6. TC CONTRACTOR SHALL PROVIDE DDC CONTROLLERS AS REQUIRED TO MEET INTENT OF DESIGN DOCUMENTS. REFER TO THE PLANS FOR THE DDC FUNCTIONS THAT APPLY TO EACH MECHANICAL SYSTEM.
- 7. ALL TC PROVIDED COMPONENTS AND ALL TC CONTRACTOR INSTALLED WIRING SHALL BE LABELED PER SPECIFICATIONS.
- 8. ALL WIRING AND SYSTEM CONTROL VOLTAGES SHALL BE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATION AND THE ELECTRICAL SPECIFICATIONS.
- 9. VARIABLE FREQUENCY CONTROLLER, FAN AND PUMP MOTOR STARTERS, STARTER WIRING. CONTROL VOLTAGE TRANSFORMERS AND ASSOCIATED POWER WIRING SHALL BE PROVIDED BY OTHER TRADES.
- 10. DUCT SMOKE DETECTORS SHALL BE FURNISHED, INSTALLED AND WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. ELECTRICAL SHALL PROVIDE FIRE ALARM SYSTEM CONTROL MODULES FOR REQUIRED SAFETIES TO MOTOR STARTERS OR VFCs AS INDICATED. CONTROL MODULES SHALL BE LOCATED NEAR RESPECTIVE MOTOR STARTERS OR VFCs. TC CONTRACTOR SHALL PROVIDE INTERLOCK WIRING FROM CONTROL MODULES TO MOTOR STARTERS OR VFCs.
- 11. ALL DDC AND CONTROL INTERLOCK WIRING SHALL BE BY TC CONTRACTOR UNLESS OTHERWISE NOTED. TC CONTRACTOR SHALL COORDINATE WITH VFC AND MOTOR STARTER SUPPLIERS TO DETERMINE EXACT WIRING REQUIREMENTS AND TERMINATION
- 12. ALL DDC AND CONTROL INTERLOCK WIRING BETWEEN COMPONENTS SHALL BE INSTALLED WITHOUT INTERMEDIATE STOPS. WIRE SPLICING AT INTERMEDIATE TERMINAL STRIPS IS NOT ACCEPTABLE.
- 13. ALL ELECTRICAL WIRING AND RACEWAY SYSTEMS SHALL COMPLY WITH ELECTRICAL SPECIFICATION REQUIREMENTS. WHERE RACEWAY IS REQUIRED, TWO SEPARATE ELECTRICAL RACEWAY SYSTEMS SHALL BE PROVIDED: ONE FOR 120V WIRING AND THE OTHER FOR 24V WIRING.

- 14. TC CONTRACTOR SHALL COORDINATE ALL GRAPHICS PROVIDED AT THE BAS FRONT-END SYSTEM WITH THE OWNER FOR POINT NAMING AND COLOR CONVENTIONS.
- 15. TC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POWER SUPPLIES REQUIRED FOR TC SYSTEM UNLESS OTHERWISE NOTED. REFER TO ELECTRICAL PANEL SCHEDULES FOR SPARE CIRCUITS OR CIRCUITS DEDICATED TO TEMPERATURE CONTROLS. COORDINATE CIRCUIT USE WITH ELECTRICAL CONTRACTOR.
- 16. TC CONTRACTOR SHALL VERIFY EXACT LOCATION OF ALL FIELD MOUNTED COMPONENTS.
- 17. THERMOSTATS AND SPACE TEMPERATURE SENSORS SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. PROVIDE GUARDS FOR SPACE TEMP SENSORS LOCATED IN PUBLIC AREA.
- 18. TC CONTRACTOR SHALL PROVIDE AUXILIARY PANELS FOR REQUIRED PANEL MOUNTED EQUIPMENT SUCH AS RELAYS, TRANSDUCERS, CONTROL TRANSFORMERS, ETC. AUXILIARY PANELS SHALL BE LOCATED NEXT TO ASSOCIATED DDC PANEL.
- 19. REMOTELY MOUNTED FIELD DEVICES SUCH AS RELAYS, CONTROL TRANSFORMERS, ETC., SHALL BE HOUSED IN AN ENCLOSURE PROVIDED BY THE TC CONTRACTOR.
- 20. CONTROL TRANSFORMERS WHEN REQUIRED SHALL BE SIZED FOR 150% OF ACTUAL
- 21. FREEZESTATS SHALL BE MOUNTED ON UPSTREAM FACE OF COOLING COILS. FREEZESTAT QUANTITY SHALL BE ONE PER 20 SQ. FT OF CROSS SECTIONAL AREA.
- 22. CURRENT SWITCHES USED FOR OPERATIONAL STATUS SHALL HAVE CURRENT THRESHOLD SETPOINT ADJUSTED TO INDICATE BELT OR DRIVE FAILURE. 23. ALL CONTROL VALVES, CONTROL DAMPERS AND ASSOCIATED CONTROL ACTUATORS
- OTHERWISE NOTED. DAMPER SIZE AND LOCATIONS ARE INDICATED ON MECHANICAL FLOOR PLAN DRAWINGS. 24. ALL CONTROL VALVES AND DAMPERS FURNISHED BY THE TC CONTRACTOR SHALL BE

IDENTIFIED ON TC DRAWINGS SHALL BE FURNISHED BY TC CONTRACTOR UNLESS

INSTALLED BY THE MECHANICAL CONTRACTOR. ALL PIPE PENETRATIONS AND BASIC FITTINGS REQUIRED FOR SENSOR INSTALLATIONS SHALL BE PROVIDED BY MECHANICAL

- CONTRACTOR. 25. DAMPER ACTUATORS SHALL BE INSTALLED BY TC CONTRACTOR UNLESS OTHERWISE

-PROVIDE FIRMWARE UPDATE TO CURRENT RELEASE

3-1 AND B-2

HP-15 BACNET

CONTROLLER

(BY MFR)

DDC

CONTROLLER |

(BY TCC)

BACNET

CONTROLLER

(BY MFR)

FOR SUPPORT OF NEW INSTALLATION

**TEMPERATURE** 

CONTROL

(DDC) PANEL

QTY AS REQ'D

DDC SYSTEM ARCHITECTURE

LOCATIONS AND COORDINATE WITH OTHER TRADES.

1. EXISTING BUILDING AUTOMATION SYSTEM IS JCI METASYS SYSTEM. NEW DDC SYSTEM

2. REFER TO TEMPERATURE CONTROL SCHEMATICS FOR THE REQUIRED POINTS ASSOCIATED

3. TC CONTRACTOR SHALL DETERMINE DDC PANEL QUANTITY AND LOCATIONS BASED ON

4. TC CONTRACTOR SHALL PROVIDE REQUIRED POWER SUPPLIES FOR TEMPERATURE

5. AUXILIARY PANEL FOR GAUGES, TRANSMITTERS, RELAYS, POWER TRANSFORMERS, ETC.

6. SEE MECHANICAL PLANS AND SCHEDULES FOR LOCATIONS AND QUANTITIES

POINT DENSITIES AND AVAILABLE MOUNTING SPACE. CONTRACTOR SHALL FIELD VERIFY

COMPONENTS SHALL BE CONNECTED TO NEW NETWORK COMMUNICATIONS. TO

CONTRACTOR SHALL UPGRADE THE EXISTING FRONT-END BAS HARDWARE/SOFTWARE AS

NECESSARY TO ACCOMMODATE NEW WORK AND PROVIDE GRAPHICS PER SPECIFICATION

(E)BACNET MS/TP

(NOTE 4

(E)COMMUN.

INTERFACE

**TEMPERATURE** 

CONTROL

**AUX PANEL** 

AS REQ'D

NOTES:

TYPICAL - NO SCALE

FOR NEW EQUIPMENT.

CONTROL SYSTEM COMPONENTS.

- 26. ALL INSTRUMENTATION TUBING REQUIRED FOR DPS AND DPT COMPONENT INSTALLATIONS SHALL BE PROVIDED BY TC CONTRACTOR.
- 27. TC CONTRACTOR SHALL FIELD MOUNT ALL REQUIRED PACKAGED CONTROL COMPONENTS FURNISHED BY EQUIPMENT SUPPLIERS WHERE INDICATED. ALL REQUIRED 24V AND 120V FIELD WIRING SHALL BE PROVIDED BY TC CONTRACTOR UNLESS NOTED OTHERWISE. TC CONTRACTOR SHALL COORDINATE SPECIFIC SYSTEM WIRING REQUIREMENTS WITH PACKAGED EQUIPMENT SUPPLIERS.



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PROJECT TITLE

TO EXISTING DDC CONTROLLERS

## Administration **Building Upgrades**

Plymouth-Canton Community Schools

DRAWING TITLE TEMPERATURE CONTROL STANDARDS AND **GENERAL NOTES** 

**ISSUE DATES** 

01-19-2017 BIDS

ISSUED FOR: DATE: DRAWN BG

CHECKED SC APPROVED **GJZ** 

13089E

PROJECT NO.

DRAWING NO.

M8.1

ALL NEW ROOM TEMPERATURE SENSORS SHALL BE PROVIDED WITH AN EXTRA LARGE STAINLESS STEEL TRIM RING, IF REQUIRED, TO PREVENT PATCHING/PAINTING OF WALL. RE-USE THE EXISTING SENSOR LOCATION FOR NEW SENSOR.

ALL DDC SENSOR WIRING MUST BE CONCEALED WITHIN THE WALLS. ALL DDC WIRING ABOVE CEILINGS MUST BE SUPPORTED IN BRIDLE

ANY USE OF EXPOSED WIRING WHETHER IN RACEWAY OR WIREMOLD IS PROHIBITED WITHOUT THE CONSENT OF THE ARCHITECT.

ANY TEMPERATURE SENSOR LOCATION NOT RE-USED SHALL BE PROVIDED WITH A BLANK, STAINLESS STEEL COVER. PROVIDE AN EXTRA LARGE STAINLESS STEEL TRIM RING, IF REQUIRED, TO PREVENT PATCHING/PAINTING.

_.._.._..

ALL WIRING SHALL BE UL PLENUM RATED.

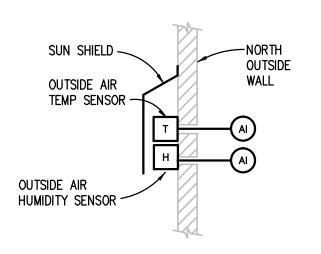
### POWER TO MOTOR MOTOR STARTER HOUSING CURRENT SENSING DEVICE-LOCATE IN MOTOR STARTER HOUSING IF SPACE IS AVAILABLE. IF SPACE IS NOT AVAILABLE, LOCATE IN DISCONNECT HOUSING OR PROVIDE ENCLOSURE.

### **CURRENT SWITCH INSTALLATION DETAIL**

- 1. FAN AND PUMP STATUS SHALL BE PROVEN BY CURRENT SWITCHES INDICATION BY DDC TO THE BAS.
- INSTALL CURRENT SWITCH ON MOTOR LEADS. CURRENT SWITCH SHALL BE ADJUSTED TO MEET THE CURRENT DRAW REQUIRED TO DETECT FAN BELT OR VFC LOSS OR PUMP COUPLING DETACHMENT OR VFC LOSS.

### SEQUENCE OF OPERATION

- DDC, IF THE CURRENT DRAW IS NOT APPROPRIATE, DDC SHALL ALARM THE MOTOR STATUS POINT. WHEN MOTOR IS ON AND NOT IN ALARM, DDC SHALL TOTALIZE RUN TIME HOURS FOR BAS USE.



OA SENSOR INSTALLATION DETAIL



CAPILLARY CLIP (TYP.)

NOTE: SOME SYMBOLS & ABBREVIATIONS SHOWN

ABBREVIATION DESCRIPTION

NORMALLY CLOSED

NOT IN CONTRACT

NORMALLY OPEN

NIGHT SETBACK

NORMALLY CLOSED TIMED CLOSED

NATIONAL FIRE PROTECTION AGENCY

NORMALLY CLOSED TIMED OPEN

NORMALLY OPEN TIMED CLOSED

NORMALLY OPEN TIMED OPEN

OUTSIDE AIR
OUTSIDE AIR TEMPERATURE

PERIMETER HEAT RETURN

PERIMETER HEAT SUPPLY

PRESSURE REDUCING VALVE

POUNDS PER SQUARE INCH

RETURN AIR TEMPERATURE

RADIANT CEILING PANEL

PARTS PER MILLION

RETURN AIR

RELIEF AIR

RETURN FAN

SUPPLY AIR

SUPPLY FAN

START/STOP

SINGLE-ZONE

SUMMER/WINTER

TEMPERATURE

UNIT HEATER

UNIT VENTILATOR

WATER COLUMN

TRANSFORMER

VARIABLE AIR VOLUME

TEMPERATURE CONTROL

TEMPERATURE CONTROL PANEL

TERMINAL HEATING RETURN

TERMINAL HEATING SUPPLY

UNDERWRITER'S LABORATORY

VERTICAL UNIT VENTILATOR

VARIABLE FREQUENCY CONTROLLER

TOTAL STATIC PRESSURE

(AIR) TERMINAL UNIT TYPICAL

STANDARD

STATIC PRESSURE

RELATIVE HUMIDIT

ROOF TOP UNIT

REQUIRED

PACKAGED AIR CONDITIONING UNIT

PRESSURE DROP (FEET OF WATER)

MAY NOT APPLY TO THIS PROJECT.

**AVERAGING ELEMENT INSTALLATION DETAIL** 

1. ALL DELAY TIMERS DESCRIBED IN THE SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS). 2. UPON FAN OR PUMP MOTOR START AND AFTER 120 SECOND (ADJUSTABLE) DELAY BY

> 3. UPON FAN OR PUMP MOTOR STOP AND AFTER 120 SECOND (ADJUSTABLE) DELAY BY DDC, IF THE CURRENT DRAW IS NOT ZERO, DDC SHALL ALARM THE MOTOR STATUS



CONSULTANT



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### PROJECT TITLE Administration **Building Upgrades**

Plymouth-Canton

Community Schools

**DRAWING TITLE TEMPERATURE** CONTROLS



01-19-2017 BIDS DATE: ISSUED FOR:

DRAWN BG CHECKED SC

APPROVED GJZ

PROJECT NO.

13089E

DRAWING NO.

M8.2

PROVIDED BY TC → FROM BLDG. TMP ARCHITECTURE INC 1191 WEST SQUARE LAKE ROAD BLOOMFIELD HILLS • MICHIGAN • 48302 → STO BLDG. PH • 248.338.4561 FX • 248.338.0223 EM • INFO@ TMP-ARCHITECTURE.COM T AI T-A REGISTRATION SEAL FIELD INSTALLED AS REQ'D PER BLR (E)CP-1 (E)CP-2 FS -MANUFACTURER BOILER BOILER B-1 B-2 120V POWER PROVIDED BY ELEC 120V POWER PROVIDED BY ELEC CONTRACTOR CONTRACTOR DI RUN STATUS
DI COMMON ALARM DI RUN STATUS
DI COMMON ALARM BOILER BUILDING CONTROL CONTROL

> HWHS TEMP RESET SCHEDULE • HOT WATER SUPPLY AIR TEMP. TEMPERATURE 180°F 140°F * RESET SCHEDULE SHALL BE

ADJUSTABLE AND SHOULD MATCH THE

EXISTING SCHEDULE.

HOT WATER HEATING SYSTEM CONTROL RENOVATION

STAGE CONTROL WIRING

SHUTDOWN RELAY (NOTE 3)

BOILER EMERGENCY

QTY PER BOILER SUPPLIER

120V OR 24V POWER

SUPPLY EXISTING.

BOILER EMERGENCY
SHUTDOWN ALARM (NOTE 3)

DDC ENABLE/DISABLE

WIRED TO DDC BACNET NETWORK (

DDC HWH RESET (AO)

120V POWER SUPPLY PROVIDED (______ BY IC CONTRACTOR

BY TC CONTRACTOR

(E)REMOTE BOILER SHUTDOWN SWITCH.

NEW REMOTE BOILER SHUTDOWN SWITCH.

2. BOILER SEQUENCING AND ASSOCIATED HWHS TEMP SENSOR FOR LEAD/LAG CONTROL OF BOILERS SHALL BE PROVIDED BY SUPPLIER OF THE NEW BOILER. FUNCTIONALITY MAY BE INCLUDED WITH THE CONTROLS OF THE NEW BOILER. TC CONTRACTOR SHALL INSTALL REQUIRED COMPONENTS AND PROVIDE FIELD WIRING AND TERMINATIONS TO EACH BOILER AS COORDINATED WITH BOILER

1. INDICATED COMPONENT FURNISHED BY BOILER SUPPLIER AND INSTALLED BY

STAGE CONTROL WIRING

SHUTDOWN RELAY (NOTE 3)

→ BOILER EMERGENCY

QTY PER BOILER SUPPLIER

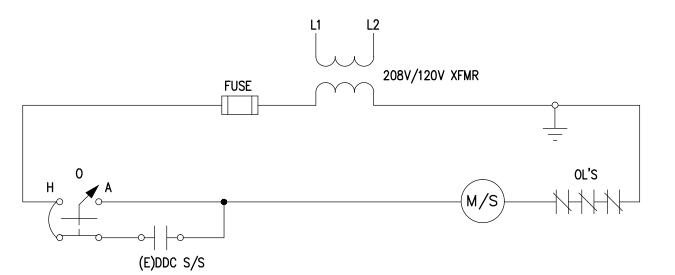
3. TC CONTRACTOR SHALL PROVIDE BOILER EMERGENCY SHUTDOWN COMPONENTS AND WIRING. REFER TO REMOTE BOILER SHUTDOWN WIRING DIAGRAM.

4. TC CONTRACTOR SHALL MODIFY ANY EXISTING RELATED DDC CONTROLS TO ACCOMMODATE CONTROLS RETROFIT AS INDICATED.

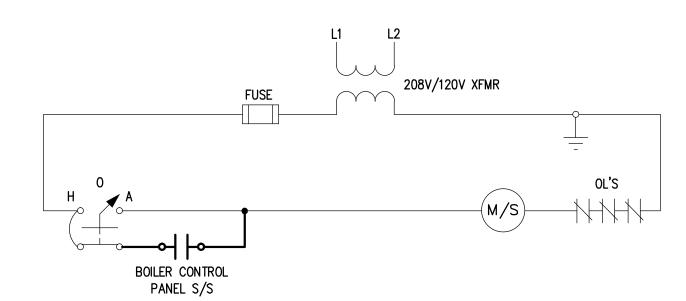
### SEQUENCE OF OPERATION

### **HOT WATER HEATING SYSTEM:**

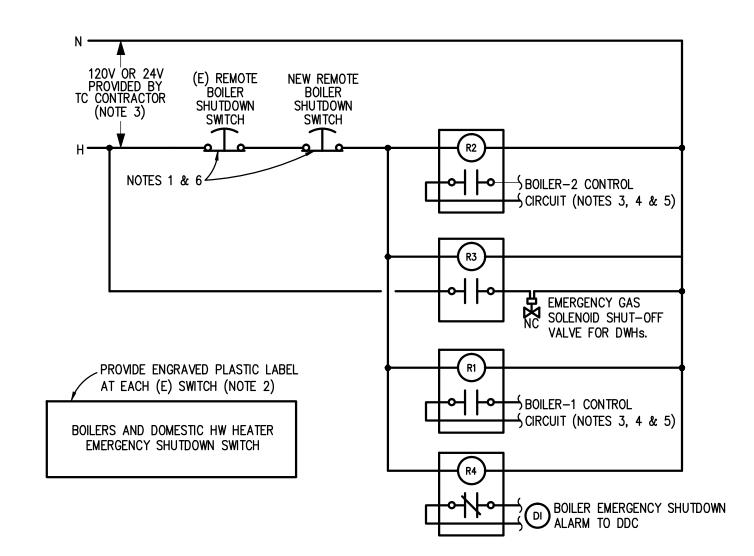
- ALL SETPOINTS, RESET SCHEDULE SETPOINTS, DEADBANDS, AND TIME INTERVALS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS. ALL MOTOR CONTROL SWITCHES SHALL BE IN "AUTO" POSITION.
- 2. HOT WATER HEATING SYSTEM SHALL BE ACTIVATED FOR CONTINUOUS OPERATION DURING BUILDING OCCUPANCY OR WHEN OUTDOOR AIR TEMPERATURE IS BELOW 50°F FOR BUILDING UNOCCUPANCY.
- 3. SECONDARY HWH CIRC PUMPS CP-1 & CP-2 SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. ONE OF THE TWO PUMPS SHALL BE ACTIVATED BY DDC TO OPERATE CONTINUOUSLY. THE OTHER WILL SERVE AS STANDBY. DDC SHALL ALTERNATE PUMP OPERATION BASED ON RUNTIME HOURS OR EVERY TWO WEEKS -OPERATOR SELECTABLE.
- 4. DDC SHALL MONITOR OPERATING STATUS OF EACH PUMP. UPON PUMP FAILURE, DDC SHALL ACTIVATE FAILURE ALARM AND AUTOMATICALLY START THE STANDBY PUMP. DDC SHALL TOTALIZE RUN TIME HOURS OF OPERATION FOR EACH PUMP.
- 5. REMOTE CONTROL SHALL BE THRU BOILER SEQUENCING PANEL FURNISHED BY BOILER SUPPLIER. DDC SYSTEM SHALL ENABLE BOILER SEQUENCING PANEL CONTROL WHEN SECONDARY HWH CIRC PUMP CP-1 OR CP-2 IS ACTIVATED. THE BOILER SEQUENCING PANEL SHALL ACTIVATE OR DEACTIVATE BOILERS AND CONTROL BOILER STAGES AS REQUIRED TO MAINTAIN HWH SUPPLY TEMP (T-5) SETPOINT BASED ON OUTSIDE AIR RESET SCHEDULE.
- 6. DDC SHALL RESET THE HWH SUPPLY SETPOINT BASED ON DDC OUTSIDE AIR TEMPERATURE SENSOR.
- 7. THE BOILER SEQUENCING PANEL SHALL INCLUDE OPERATOR SELECTABLE BOILER LEAD/LAG OPERATION OR FIRST ON/FIRST OFF OPERATION.
- 8. WHENEVER A BOILER CIRCUIT IS ACTIVATED, ITS RESPECTIVE PRIMARY CIRC PUMP SHALL BE ACTIVATED BY FACTORY WIRED PUMP RELAY. BOILER SHALL NOT FIRE UNTIL FLOW IS PROVEN BY FLOW SWITCH.
- 9. WHENEVER A BOILER IS DEACTIVATED, A BOILER SYSTEM CONTROLLED TIME DELAY SHALL KEEP PUMP RUNNING FOR A FEW MINUTES (TIME BASED ON BOILER MANUFACTURER RECOMMENDATION) TO DISSIPATE HEAT FROM THE DEACTIVATED
- 10. IF REMOTE CONTROL IS LOST, LOCAL BURNER MODULATING CONTROL AT EACH BOILER SHALL BE SET TO MAINTAIN 180°F LEAVING WATER TEMPERATURE.
- 11. EACH BOILER SAFETY CONTROLS SHALL INCLUDE AN AUTO—RESET HI—LIMIT (BOILER OPERATOR) WITH SETPOINT OF 190°F AND A MANUAL-RESET HI-LIMIT WITH SETPOINT
- 12. DDC SHALL MONITOR BOILER RUN STATUS AND COMMON ALARM FOR EACH BOILER THROUGH DRY CONTACTS AVAILABLE IN RESPECTIVE BOILER CONTROL PANEL.
- 13. DDC SHALL MONITOR BOILER PRIMARY TEMPERATURES (T-1 & T-2) AND HWH SECONDARY TEMPERATURES (T-4 & T-5) FOR DIAGNOSTIC PURPOSES. WHEN HWH SYSTEM IS ACTIVATED, AND AFTER A 20 MINUTE DELAY, IF HWH SUPPLY TEMP (T-4) DROPS BELOW 140°F, DDC SHALL ACTIVATE ALARM.
- 14. WHEN ONE OF THE REMOTE BOILER SHUTDOWN SWITCHES IS PUSHED, BURNER CONTROLS FOR ALL BOILERS SHALL BE DE-ENERGIZED THRU HARDWIRE INTERLOCK. DDC SHALL MONITOR SWITCH CIRCUIT AND ACTIVATE ALARM WHEN REMOTE BOILER SHUTDOWN CONDITION OCCURS.



HWH PUMPS (E)CP-1 & 2 M/S WIRING



HWH CP-1, & -2 M/S WIRING



### REMOTE BOILERS/DWH EMERGENCY SHUTDOWN WIRING

- 1. REFER TO FLOOR PLANS FOR EXISTING AND NEW SWITCHES. INTERLOCK NEW BOILER'S SHUTDOWN RELAY AND (E)DWH GAS SHUTOFF SOLENOID VALVE WITH THE EXISTING
- 2. TC CONTRACTOR SHALL PROVIDE SIGN (NAME PLATE) TO BE PLACED DIRECTLY ABOVE OR BELOW EACH EXISTING PUSHBUTTON SWITCH THAT READS: "BOILERS AND DOMESTIC HW HEATER EMERGENCY SHUTDOWN". FIELD VERIFY EXISTING SWITCH
- 3. TC CONTRACTOR SHALL SUPPLY POWER TO NEW CONTROL RELAYS FROM EXISTING POWER CIRCUIT. COORDINATE WITH ELECTRICAL CONTRACTOR AS NECESSARY.
- 4. TC CONTRACTOR SHALL WIRE NEW BOILER'S CONTROL CIRCUIT (POWER FROM SECONDARY SIDE OF CONTROL TRANSFORMERS) AND (E)DWH GAS SHUTOFF SOLENOID VALVE THRU NORMALLY OPEN RELAY CONTACTS. TC CONTRACTOR SHALL COORDINATE
- EXACT WRING AND TERMINATION REQUIREMENTS WITH EQUIPMENT MANUFACTURERS. 5. TC CONTRACTOR SHALL MOUNT SHUTDOWN CONTROL RELAY AT RESPECTIVE BOILER CONTROL PANEL. SHUTDOWN AND GAS VALVE RELAYS SHALL BE MOUNTED IN DDC AUXILIARY PANEL.
- 6. TC CONTRACTOR SHALL RE-USE EXISTING EMERGENCY PUSHBUTTON SWITCH AS SHOWN ON PLANS.

### **SEQUENCE OF OPERATION:**

DEVICES/WIRING.

- 1. UNDER NORMAL OPERATING CONDITIONS THE CIRCUIT SHALL BE ENERGIZED AND THE RELAYS' NORMALLY OPEN (NO) CONTACTS SHALL BE CLOSED. WHEN A SWITCH IS PUSHED (LATCHED) THE RELAY CONTACTS SHALL OPEN AND INTERRUPT EACH BOILER'S CONTROL CIRCUIT AND CLOSE (E)DWH GAS SHUTOFF SOLENOID VALVE. WHEN THE SWITCH IS RELEASED, THE RELAYS SHALL BE ENERGIZED AND THE NORMALLY OPEN CONTACTS SHALL CLOSE, ENERGIZING EACH BOILER'S CONTROL CIRCUIT AND OPEN THE (E)DWH GAS SHUTOFF SOLENOID VALVE (PILOT LIGHT MAY NEED TO BE MANUALLY IGNITED).
- 2. DDC SHALL ACTIVATE AN ALARM WHEN A REMOTE PUSHBUTTON SWITCH HAS BEEN

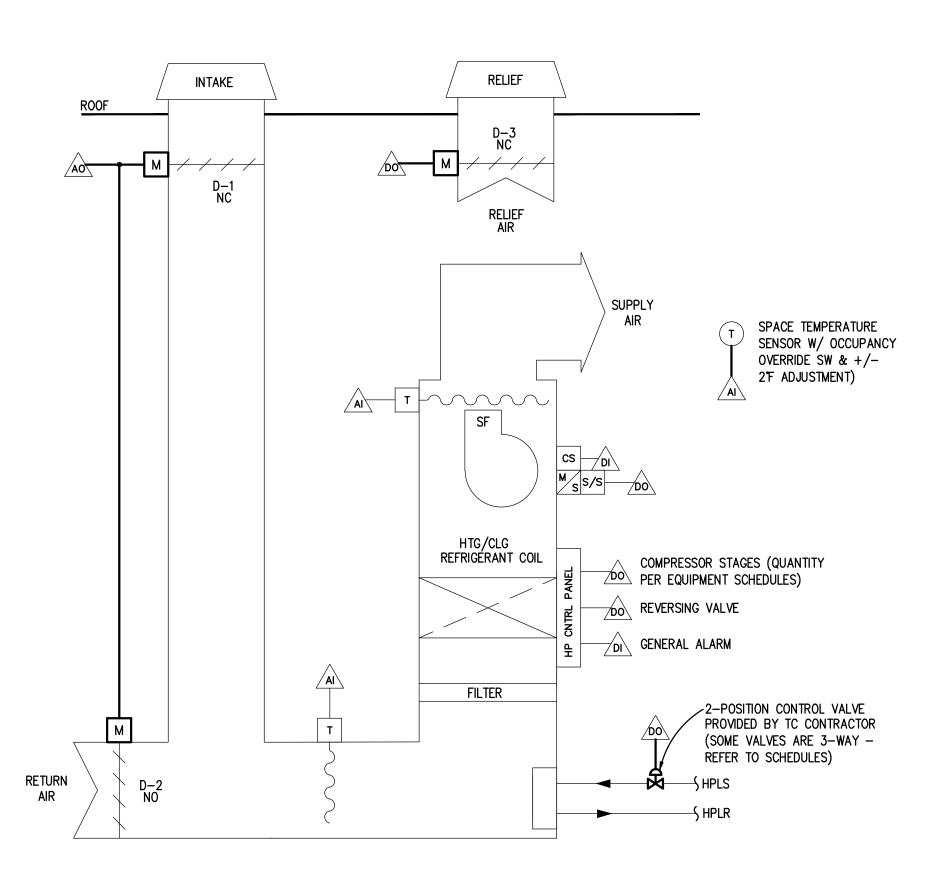
(E)DOMESTIC HW HEATER

> - EMERGENCY GAS RELAY SHUT-OFF FOR (E) DWH (NOTE 3) (TYP)

EMERGENCY GAS SOLENOID SHUT-OFF

VALVE FOR DWH (NOTE 3) (TYP)

— GAS



### WATER SOURCE HEAT PUMP CONTROL

NOTE:

 COORDINATE WIRING, TERMINATION, CONTROL, AND I/O REQUIREMENTS WITH EQUIPMENT MANUFACTURER. SPECIFIC CONTROL REQUIREMENTS MAY DIFFER SLIGHTLY DEPENDING ON EQUIPMENT MANUFACTURER.

2. MANUFACTURER SHALL PROVIDE BACNET, OPEN SOURCE, HEAT PUMP CONTROLLER, SENSORS, CONTROL DEVICES, INTERNAL WIRING, ETC., FOR A COMPLETE DDC SYSTEM. TC CONTRACTOR SHALL PROVIDE FIELD WIRING OF DEVICES AND SENSORS THAT ARE

### SEQUENCE OF OPERATION

VUV - WATER SOURCE HEAT PUMP CONTROL:

- 1. THE MANUFACTURER'S HEAT PUMP CONTROLLER SEQUENCE OF OPERATION MAY NOT EXACTLY MATCH THE SEQUENCE SHOWN BELOW. WHERE VARIANCES OCCUR, THE MANUFACTURER SHALL DOCUMENT IN THE EQUIPMENT SUBMITTALS.
- 2. ALL SETPOINTS, DEADBANDS, DELAY TIMERS, ETC., INCLUDING TIME—OF—DAY HOURS OF OPERATION AND SETPOINTS DESCRIBED IN SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS. APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS. ALL MOTOR CONTROL SWITCHES SHALL BE IN THE "AUTO" POSITION
- 3. VUV-HEAT PUMP UNIT SHALL HAVE START/STOP CAPABILITY FROM THE DDC SYSTEM. VUV-HEAT PUMP SHALL OPERATE BASED ON TIME SCHEDULED OCCUPIED MODE COMPENSATED BY OPTIMUM START/STOP, TEMPORARY OCCUPIED MODE (SET FOR 2 HOURS ENABLED FROM OVERRIDE SWITCH ON TEMPERATURE SENSORS) AND UNOCCUPIED CYCLE MODE.
- 4. VUV-HEAT PUMP SHALL NOT BE ACTIVATED UNTIL HEAT PUMP LOOP FLOW IS PROVEN BY DDC FOR A PERIOD OF 2 MINUTES.
- 5. DURING BUILDING OCCUPANCY: SUPPLY FAN SHALL OPERATE CONTINUOUSLY, ASSOCIATED MIXED AIR DAMPERS SHALL BE CONTROLLED AS DESCRIBED HEREIN.
- 6. DURING BUILDING UNOCCUPANCY: SUPPLY FAN SHALL BE CYCLED ON & OFF TO MAINTAIN UNOCCUPIED MODE SPACE TEMPERATURE SETPOINTS. MIXED AIR DAMPERS AND RELIEF DAMPER SHALL CLOSE TO OUTSIDE AIR.
- 7. SUPPLY FAN STATUS SHALL BE MONITORED BY DDC THRU RESPECTIVE CURRENT SWITCH. ABNORMAL STATUS CONDITION FOR ANY OF THESE DEVICES SHALL ACTIVATE ALARM. DDC SHALL TOTALIZE RUN TIME HOURS OF OPERATION.
- 8. WHEN SPACE TEMP RISES ABOVE COOLING SETPOINT, THE HEAT PUMP UNIT CONTROLLER SHALL SWITCH REVERSING VALVE TO COOLING MODE POSITION, OPEN HEAT PUMP LOOP ISOLATION VALVE, AND ACTIVATE COMPRESSOR (2—STAGES WHERE APPLICABLE) TO ACHIEVE SETPOINT.
- 9. WHEN SPACE TEMP FALLS BELOW HEATING SETPOINT; THE HEAT PUMP UNIT CONTROLLER SHALL SWITCH REVERSING VALVE TO HEATING MODE POSITION, OPEN HEAT PUMP LOOP ISOLATION VALVE, AND ACTIVATE COMPRESSOR (2-STAGES WHERE
- APPLICABLE) TO ACHIEVE SETPOINT.

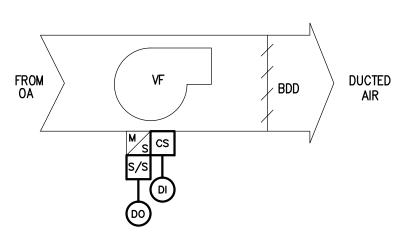
  10. ZONE SPACE TEMPERATURE SETPOINTS SHALL BE AS FOLLOWS:
  - HEATING UNOCCUPIED SETPOINT = 62°F

COOLING UNOCCUPIED SETPOINT = 85°F

- HEATING OCCUPIED SETPOINT = 72°F COOLING OCCUPIED SETPOINT = 75°F
- 11. DDC SHALL OVERRIDE COMPRESSOR AS REQUIRED TO PREVENT DISCHARGE AIR TEMPERATURE FROM DROPPING BELOW LOW LIMIT SETPOINT OF 50°F WHEN COOLING
- 12. HEAT PUMP LOOP ISOLATION VALVE SHALL BE CLOSED WHEN ALL COMPRESSOR STAGES ARE DEACTIVATED.
- 13. DDC SHALL MONITOR GENERAL ALARM FROM HEAT PUMP CONTROL.

AND RISING ABOVE 90°F WHEN HEATING.

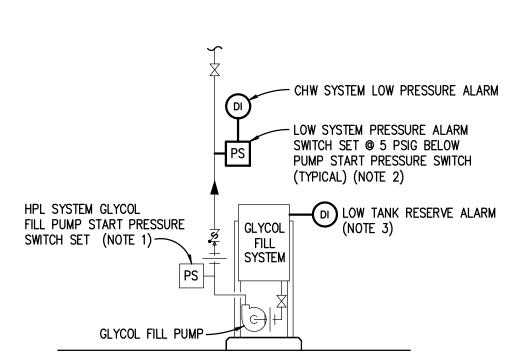
14. IF BOTH HEAT PUMP LOOP DISTRIBUTION PUMPS FAIL, HEAT PUMP UNIT COMPRESSOR CONTROL SHALL BE DEACTIVATED BY DDC TO PREVENT LOCAL SAFETY CUTOUT FROM OCCURRING AT RESPECTIVE HEAT PUMP CONTROLLER. IF HEAT PUMP IS OPERATING IN THE HEATING MODE, THE ENTIRE UNIT SHALL BE DEACTIVATED. HEAT PUMP OPERATION AND COMPRESSOR CONTROL SHALL AUTOMATICALLY RESTART WHEN RESPECTIVE FAILURE ALARM IS CLEARED.



### **VENTILATION FAN CONTROL**

SEQUENCE OF OPERATION:

VENTILATION FAN WILL BE ACTIVATED BY BAS/DDC TIME OF DAY SCHEDULE FOR THE BUILDING.



### GLYCOL FILL STATION MONITORING

GLYCOL FILL STATION SERVES HPL SYSTEM

NOTE:

- 1. PUMP CONTROL PRESSURE SWITCH AND ASSOCIATED CONTROL WIRING ARE PROVIDED WITH GLYCOL FILL STATION.
- 2. PRESSURE SWITCH FOR ALARM MONITORING SHALL BE FURNISHED BY TC CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.
- 3. DRY CONTACTS FOR REMOTE MONITORING OF LOW TANK RESERVE ALARM PROVIDED WITH GLYCOL FILL STATION.

TC GENERAL NOTES

TC GENERAL NOTES ON DRAWING M8.1 APPLY TO THIS DRAWING.



T M P A R C H I T E C T U R E I N C

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Administration
Building Upgrades

Plymouth-Canton Community Schools

TEMPERATURE
CONTROLS

ISSUE DATE	ES
01-19-2017	BIDS

DRAWN	BG	
CHECKED	SC	

DATE:

ISSUED FOR:

PROJECT NO.

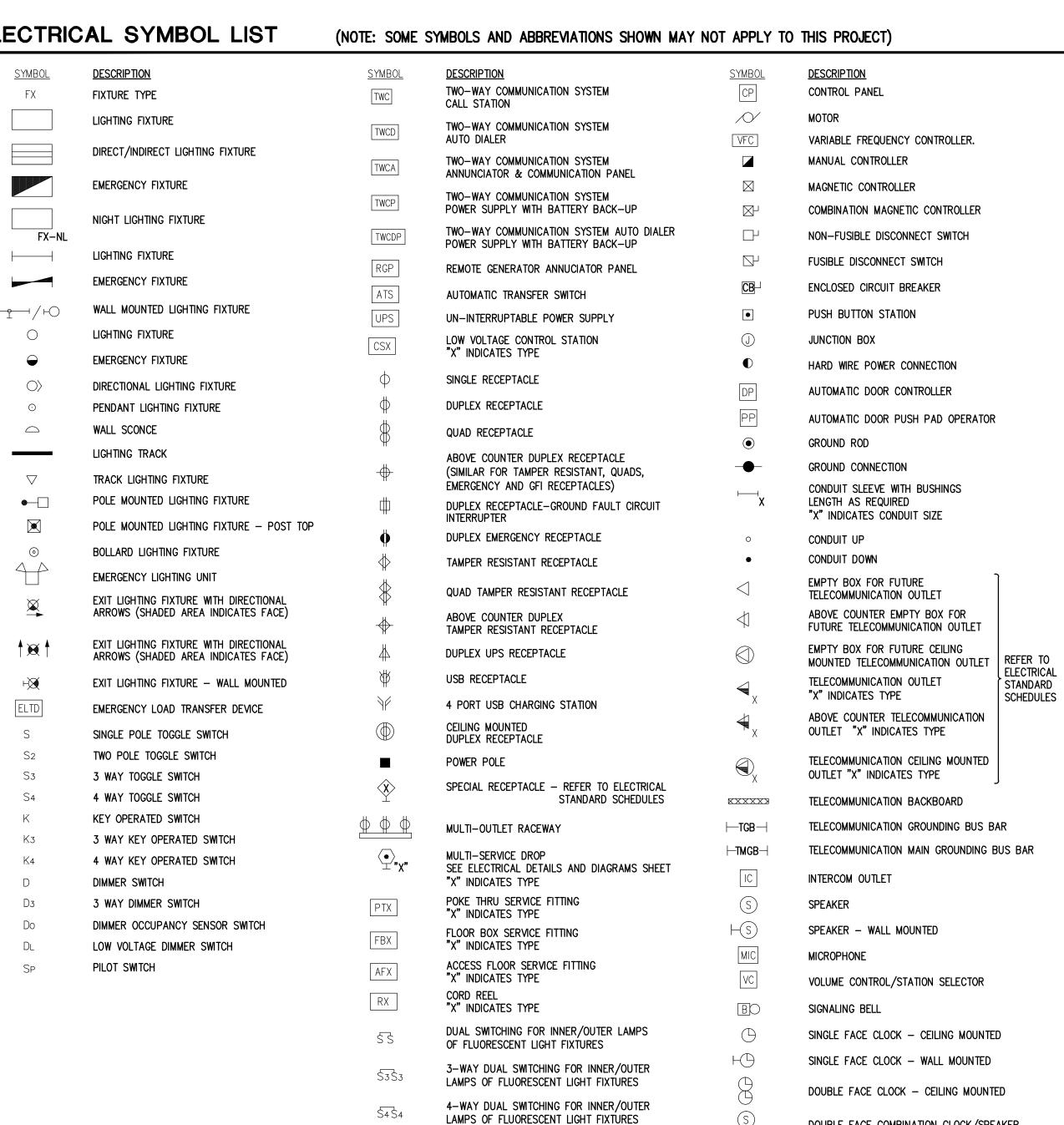
APPROVED GJZ

13089E

DRAWING NO.

M8.3

STANDARD MOUNTING HEIGHTS



<u>SYMBOL</u> **DESCRIPTION** MANUAL FIRE ALARM BOX SMOKE DETECTOR DUCT SMOKE DETECTOR CARBON MONOXIDE DETECTOR

MOTION DETECTOR SECURITY KEY SWITCH DOOR CONTACT

<u>SYMBOL</u>

**DESCRIPTION** 

SWITCH

FUSE

TRANSFORMER

PANELBOARD

GROUND

"X" INDICATES PANELBOARD NAME

STRESS CONE TERMINATION

SECURITY KEY INTERLOCK

ELECTRONIC METERING UNIT

SURGE PROTECTIVE DEVICE

THERMAL OVERLOAD RELAY

NORMALLY OPEN CONTACTS

NORMALLY CLOSED CONTACTS

N.O. PUSH BUTTON SINGLE CIRCUIT

N.C. PUSH BUTTON SINGLE CIRCUIT

BRANCH CIRCUIT PANELBOARD

MOTOR CONTROL CENTER

ENGINE GENERATOR

UTILITY METER

AMMETER

VOLTMETER

AMMETER SWITCH

CONTROL RELAY

CABLE VAULT

LOAD CENTER

TRANSFORMER

DISTRIBUTION PANEL

PLUG IN BUSWAY

FEEDER BUSWAY

"X-X" INDICATES TYPE

TIME DELAY RELAY

**→ •** | | ·

DOUBLE FACE COMBINATION CLOCK/SPEAKER

DOUBLE FACE COMBINATION CLOCK/SPEAKER

DOUBLE FACE CLOCK - WALL MOUNTED

CEILING MOUNTED

WALL MOUNTED

TIME CLOCK

CONTACTOR

SECURITY CAMERA

KEY PAD REMOTE TEST STATION (FOR DUCT DETECTOR) ACCESS CONTROL STATION THERMAL DETECTOR PROJECTED BEAM DETECTOR DURESS PUSH BUTTON STATION

DELAYED EGRESS FO FIRE ALARM BELL FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE REQUEST TO EXIT STATION FIRE ALARM VISUAL NOTIFICATION APPLIANCE CIRCUIT BREAKER "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd DRAWOUT CIRCUIT BREAKER MANUALLY/ OPERATED

FIRE ALARM COMBINATION VISUAL/ AUDIBLE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd DRAWOUT CIRCUIT BREAKER ELECTRICALLY/ OPERATED FIRE ALARM COMBINATION VISUAL/ AUDIBLE NOTIFICATION APPLIANCE— CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd AUTOMATIC OR MANUAL TRANSFER SWITCH

FIRE ALARM VISUAL NOTIFICATION APPLIANCE CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd CURRENT TRANSFORMER FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE -CEILING MOUNTED POTENTIAL TRANSFORMER LIGHTNING ARRESTOR FIREFIGHTERS PHONE JACK

> FACP FIRE ALARM CONTROL PANEL FIRE ALARM ANNUNCIATOR PANEL NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL ADDRESSABLE MONITORING MODULE СМ

ADDRESSABLE CONTROL MODULE TAMPER SWITCH

FLOW SWITCH MAGNETIC DOOR RELEASE

PHOTOCELL OCCUPANCY SENSOR "X" INDICATES TYPE TWIST TIMER

DIGITAL TIME SWITCH

LOW VOLTAGE SWITCH

OCCUPANCY SENSOR

ILLUMINATED TOGGLE SWITCH FOR CONTROL OF

LIGHTING ON CRITICAL POWER-ILLUMINATED

OCCUPANCY SENSOR REFER TO ELECTRICAL

STANDARD SCHEDULES

WHEN SWITCH IS IN "OFF" POSITION

**ELECTRICAL ABBREVIATION LIST** 

FOOD SERVICE EQUIPMENT CONTRACTOR NTS

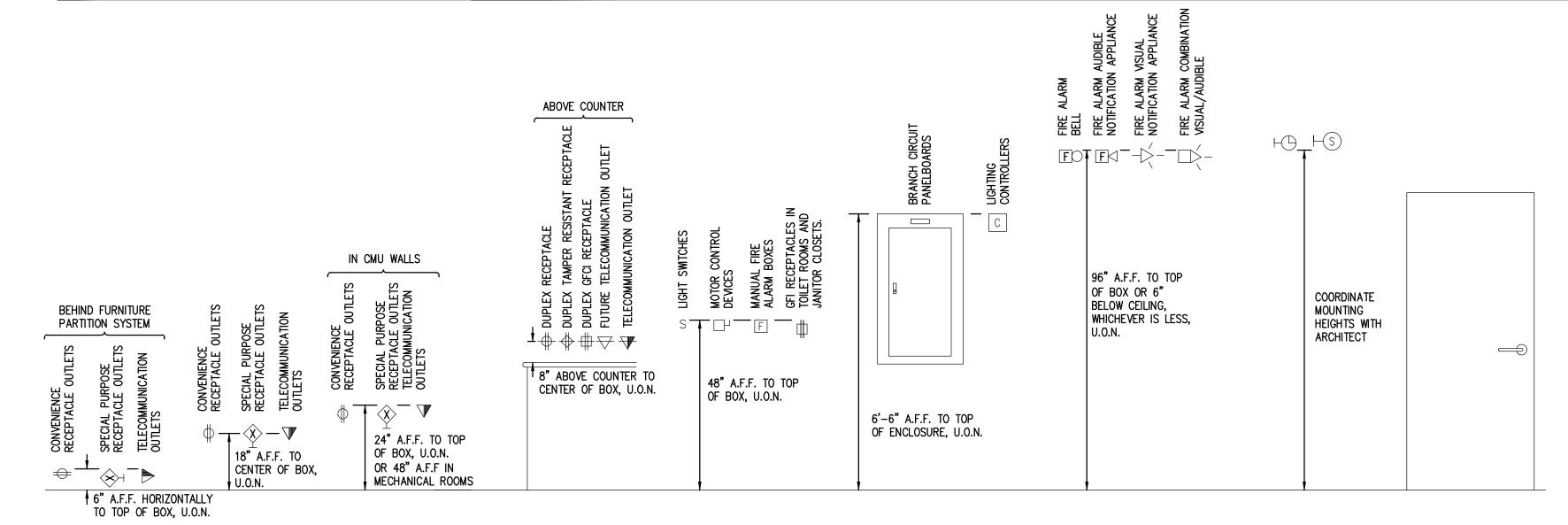
STANDARD METHODS OF NOTATION

FSEC

EF 1

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
A	AMPERES	G/GRD/EG	GROUND	OC OC	ON CENTER
AF	AMPERES FRAME (BREAKER RATING)	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	OFCI	OWNER FURNISHED,
A.F.F.	ABOVE FINISH FLOOR	GFP	GROUND FAULT PROTECTION	OFCI	CONTRACTOR INSTALLED
AIC	AMPS INTERRUPTING CAPACITY			OFOI	OWNER FURNISHED,
AL	AUDIENCE LEFT	HOA	HAND-OFF-AUTO	01 01	OWNER INSTALLED
AR	AUDIENCE RIGHT	HP	HORSEPOWER	5	
AT	AMPERES TRIP (BREAKER SETTING)	HV HZ	HIGH VOLTAGE HERTZ	P	POLE
ATS	AUTOMATIC TRANSFER SWITCH			PB	PUSHBUTTON STATION
AUX	AUXILIARY	IG	ISOLATED GROUND	PH	PHASE TRANSFORMER
BKR	BREAKER	JB	JUNCTION BOX	PT PDP	POTENTIAL TRANSFORMER
BPS	BOLTED PRESSURE SWITCH			רטף	POWER DISTRIBUTION PANEL
		KV	KILOVOLT	RECEPT.	RECEPTACLE
C CB	CONDUIT CIRCUIT BREAKER	KVA	KILOVOLT — AMPERES	RDP	RECEPTACLE DISTRIBUTION PANEL
CFCI	CONTRACTOR FURNISHED,	KW KWH	KILOWATT KILOWATT — HOURS	RP	RECEPTACLE PANEL
OI OI	CONTRACTOR FORMISHED,	KWΠ	KILOWATT - HOURS	RSC	RIGID STEEL CONDUIT
CKT	CIRCUIT	LA	LIGHTNING ARRESTOR	SCHED	SCHEDULE
CT	CURRENT TRANSFORMER	LP	LIGHTING PANEL	SW	SWITCH
		LDP	LIGHTING DISTRIBUTION PANEL	SWBD	SWITCHBOARD
DEMO DIM	DEMOLITION DIMENSION	MAX	MAXIMUM	SWGR	SWITCHGEAR
DISC	DISCONNECT	MCB	MAIN CIRCUIT BREAKER	TB	TERMINAL BOX
DP	DISTRIBUTION PANEL	MCC	MOTOR CONTROL CENTER	TELECOM	TELECOMMUNICATIONS
DS	DOWNSTAGE	MDP	MAIN DISTRIBUTION PANEL	TR	TAMPER RESISTANT
DWG	DRAWING	MECH	MECHANICAL	TTB	TELEPHONE TERMINAL BACKBOARD
		MIN	MINIMUM	TYP	TYPICAL
EBU	EMERGENCY BATTERY UNIT	MISC.	MISCELLANEOUS		
EC	ELECTRICAL CONTRACTOR	MLO	MAIN LUGS ONLY	U.O.N. US	UNLESS OTHERWISE NOTED UPSTAGE
ELEC	ELECTRICAL EMERGENCY	MTD	MOUNTED		
EM/ EMERG EMT	ELECTRICAL METALLIC TUBING	MTG	MOUNTING	V	VOLTS
EO	ELECTRICAL METALLIC TOBING ELECTRICALLY OPERATED	MTR	MOTOR	W	WRE
EPO	EMERGENCY POWER OFF	N	NEUTRAL	WP	WEATHERPROOF
EWC	ELECTRIC WATER COOLER	NC	NORMALLY CLOSED	VEND	TDANCEODMED
EXIST	EXISTING	NEC	NATIONAL ELECTRICAL CODE	XFMR XP	TRANSFORMER
		NF	NON-FUSIBLE		EXPLOSION PROOF
FA	FIRE ALARM	NIC	NOT IN CONTRACT	(E)	EXISTING
FLA	FULL LOAD AMPS	NL	NIGHT LIGHT	(R)	RELOCATED
FLR	FLOOR	NO	NORMALLY OPEN	` '	
FOH	FRONT OF HOUSE				

NOT TO SCALE



### **ELECTRICAL DRAWING INDEX**

E2.2

SHEET NO. SHEET TITLE ELECTRICAL STANDARDS AND DRAWING INDEX E0.1 E0.2 ELECTRICAL STANDARD SCHEDULES

ED1.1 LOWER AND FIRST FLOOR ELECTRICAL DEMOLITION PLANS ED1.2 SECOND FLOOR ELECTRICAL DEMOLITION PLAN E2.1 LOWER LEVEL AND FIRST FLOOR ELECTRICAL NEW WORK PLANS

SECOND FLOOR ELECTRICAL NEW WORK PLANS

ARCHITECTURE

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PROJECT TITLE Administration

**Building Upgrades** 

Plymouth-Canton Community Schools

DRAWING TITLE ELECTRICAL STANDARDS AND DRAWING INDEX

	CONSTRUCTION OR DEMOLITION NOTE NUMBER		HEAVY LINE WEIGHT INDICATES NEW WORK
	MECHANICAL EQUIPMENT DESIGNATION		LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT OR REFERENCED INFORMATION
•	SECTION NUMBER		GRAY LINE INDICATES BACKGROUND INFORMATION
	SECTION HOMBEN		THIN GRAY LINE INDICATES CEILING GRID
E7.1	SHEET ON WHICH SECTION IS DRAWN		DASHED LINES INDICATE CONDUIT ROUTED IN OR BELOW SLAB OR GRADE
	AREA OF ENLARGEMENT	<del>'////////////////////////////////////</del>	HATCH MARKS INDICATE EQUIPMENT TO BE DISCONNECTED AND REMOVED.

CIRCUIT HOMERUN

SECTION OR ENLARGED PLAN E3.1 SCALE: 1/8" - 1" - 0" SHEET ON WHICH SECTION IS CUT (ENLARGED PARTIAL PLAN SIMILAR)

SHEET ON WHICH ENLARGED PLAN IS DRAWN

PLAN NUMBER

**ISSUE DATES** 01-19-2017 BIDS ISSUED FOR: DRAWN BAG

CHECKED SC APPROVED GJZ

PROJECT NO.

13089E

DRAWING NO.

OVERCURRENT		SIZE R KCMIL)		CO	ONDUIT SIZE
DEVICE RATING (AMPERES)	PHASE & NEUTRAL	GROUND	SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G)	SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	THREE PHASE 3 WIRE+G (3PH, 1G)
15-20	12	12	3/4"	3/4"	3/4"
25-30	10	10	3/4"	3/4"	3/4"
35-40	8	10	3/4"	3/4"	3/4"
45-50	8 (6)	10	3/4"	3/4"	3/4"
60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")
70	4	8	1"	1 1/4"	1 1/4"
80	4 (3)	8	1"	1 1/4"	1 1/4"
90–100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"
110	2 (1)	6	-	1 1/4"	1 1/4"
125	1 (1/0)	6	_	1 1/4" (1 1/2")	1 1/4" (1 1/2")
150	1/0	6	_	1 1/2"	1 1/2"
175	2/0	6	_	2"	2"
200	3/0	6	_	2"	2"
225	4/0	4	_	2"	2"
250	250	4	_	2 1/2"	2 1/2"
300	350	4		2 1/2"	2 1/2"
350	500	3		3"	3"
400	500	3		3"	3"
450	2-4/0	2-2	_	2-2"	2-2"
500	2-250	2-2		2-2 1/2"	2-2 1/2"
600	2-350	2–1	_	2-2 1/2"	2-2 1/2"
700	2-500	2-1/0	_	2-3"	2-3"
800	2-500	2-1/0	_	2-3"	2-3"
1000	3-400	3-2/0		3–3"	3–3"
1200	3-600	3–3/0		3-3 1/2"	3-3 1/2"
1600	4–600	4-4/0	_	4-3 1/2"	4-3 1/2"
2000	5-600	5-250	_	5-3 1/2"	5-3 1/2"

- 1. CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE. 2. CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
- 3. CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/O. LARGER THAN #4/O ARE BASED ON TYPE XHHW. 4. CONDUCTORS ARE BASED ON 90°C, 600V. INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR
- TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES. 5. CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.

- 5-3 1/2" 5-3 1/2" 5-3 1/2"

4-3 1/2" 4-3 1/2" 4-3 1/2"

& NEUTRAL

4 WIRE+G

(3PH, 1N, 1G)

1 1/4"

1 1/2"

3-3 1/2"

- 6. ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LUG SIZES.
- 7. SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
- 8. OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY. 9. SPLICE FROM ALUMINUM TO COPPER PRIOR TO ENTERING EQUIPMENT LISTED FOR USE WITH COPPER CONDUCTORS ONLY OR USE COPPER CONDUCTORS FOR THE ENTIRE LENGTH OF FEEDER.

Y A		CABLE	DUIT	EMT)	WAY	ENT)	()M-	ABLE	(IMC)	-MC)	FNC)	SNOI	DUT	ABLE	140	TYPE EPC-80	4	8	KEYED NOTES
KACEWAT			RIGID CONDUIT	ELECTRICAL METALLIC TUBING (EMT)	SURFACE RACEWAY	ELECTRICAL NONMETALLIC TUBING (ENT)	FLEXIBLE METAL CONDUIT (FMC)	OPTICAL FIBER/COMMUNICATION CABLE	INTERMEDIATE METAL CONDUIT (IMC)	LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)	LIQUIDTIGHT FLEXIBLE NONMETAL CONDUIT (LFNC)	PLENUM-TYPE OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY	RIGID STEEL CONDUIT	RISER-TYPE OPTICAL FIBER/COMMUNICATIONS CABLE			SCHEDULE	SCHEDULE	
		AC/MC	RIGID	12B	ACE.	188	NOS.	ICATI	CON	OND	ONDL	INMINI		ATIO	₹	<u> </u> ₹			
			NOM	ALLIC	SUR	ALLIC	IAL	NOW I	ETAL	AL C	AL C	R/CC	음 등	NO NO NO NO NO NO NO NO NO NO NO NO NO N	RNC)	RNC)	DPE)	(HDPE)	
			ALUMINUM	MET		NMET	E ME	(CO)	TE ME	. MET	NMET	FIBE	<del>~</del>	WOO,	CONDUIT (RNC)	RIGID NONMETALLIC CONDUIT (RNC)	HIGH DENSITY POLYTHYLENE (HDPE)	   	
			`	SCAL		N N	EXB.	FIBER	EDIA.	XIBLE	E NO	IICAL		BER/		QNOS	HALE)	HIGH DENSITY POLYTHYLENE	
				LECT		RICA	=	CAL	ITERN	I FLE	EXIBL	M A M		AL F	2	SI	애제	ᄣ	
						EEC.		OPTI		ПСН1	IT FL	-TYPE		일	RIGID NONMETALLIC	METAI	ĭ	ĭ	
								-USE		IQUID	эпс	NUM-		ĮŲ,		NON	ENSI	ENSI	
								RAL-WAY		7	LIQUI	RE		R-T FWA	를 달		匮	匮	
								GENERAL-USE RACEWAY						RISE	<u> </u>	"	=	=	
<u> </u>	EXPOSED								Χ				Х						
X000100	CONCEALED (ABOVE GROUND)								Х				Х						
ر	UNDERGROUND												X		X	X	Х	Х	
	CONNECTED TO VIBRATING EQUIPMENT									Х									EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENT
YOOON I	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE — UNFINISHED SPACES			Х															
	EXPOSED NOT SUBJECT TO PHYSICAL DAMAGE — FINISHED SPACES				Х														
	EXPOSED SUBJECT TO SEVERE PHYSICAL DAMAGE								Х				Х						RIGID STEEL CONDUIT UP TO 10'-0"AFF. LOCATIONS INCLUDE: LOADING DOCKS, CORRIDORS USED FO TRAFFIC OF MECHANIZED CARTS AND PALLET HANDLING UNITS, MECHANICAL ROOMS
	CONCEALED IN CEILINGS, INTERIOR WALL AND PARTITIONS	Х		Х															NOT TO EXCEED 6'-0" IN CEILING SPACE
	CONNECTED TO VIBRATING EQUIPMENT						Х			X									EQUIPMENT INCLUDING: TRANSFORMERS, HYDRAULIC PNEUMATIC, ELECTRIC SOLENOID, MOTOR DRIVEN EQUIPMENUSE LFMC IN DAMP/WET LOCATIONS
	DAMP AND WET LOCATIONS								Х				Х						
	BELOW SLAB IN GRADE														X	X			PROVIDE RIGID STEEL ELBOWS WHERE CONDUIT PENETRATES SLAB. CONDUIT INSTALLED 6" BELOW BOTTOM OF SLAB
	EMBEDDED IN CONCRETE ABOVE GRADE		Г										Х		X	Х			SELON SOLVEN
	OPTICAL FIBER OR COMMUNICATIONS CABLE IN SPACES USED FOR ENVIRONMENTAL AIR			Х								Х							
	CONCEALED GENERAL PURPOSE DISTRIBUTION OF OPTICAL FIBER OR COMMUNICATION CABLE			Х				X				Х		Х					
SNS	MRI		Х																
SPECIAL APPLICATIONS	NATATORIUMS/FOUNTAINS			Х															USE COMPRESSION FITTINGS. PAINTED WITH CORROSION RESISTANT PAINT BY PAINTING CONTRACTOR.
칚다																			

1. 'X' INDICATES ACCEPTABLE SELECTION.

2. REFER TO "CONDUCTORS AND CABLES" SPECIFICATION FOR APPLICATION LIMITATIONS OF AC/MC CABLE.

MOTOR HP	SWITCH/ FUSE	CIRCUIT BREAKER	STARTER SIZE/TYPE	MOTOR DISCONNECTONOTE 3)
1/2	30/6A	15A	1	30A
3/4	30/6A	15A	1	30A
1	30/10A	15A	1	30A
1 1/2	30/10A	15A	1	30A
2	30/10A	15A	1	30A
3	30/20A	20A	1	30A
5	30/25A	35A	1	30A
7 1/2	60/40A	50A	1	60A
10	60/50A	60A	2	60A
15	60/60A	90A	3	60A
20	100/90A	100A	3	100A
25	100/100A	110A	3	100A
30	200/125A	125A	4	200A
40	200/175A	175A	4	200A
50	200/200A	200A	5	200A
60	400/250A	250A	5	400A
75	400/300A	300A	5	400A
100	400/400A	400A	6	400A
125	600/500A	600A	6	600A
150	600/600A	600A	6	600A

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PROJECT TITLE Administration **Building Upgrades** 

Plymouth-Canton
Community Schools

DRAWING TITLE ELECTRICAL STANDARD SCHEDULES

<b>ISSUE DATES</b>	

01-19-2017 BIDS ISSUED FOR:

DRAWN BG CHECKED SC

APPROVED GJZ

PROJECT NO.

13089E

DRAWING NO.

NOTE: SOME SYMBOLS AND ABBREVIATIONS

SHOWN MAY NOT APPLY TO THIS PROJECT.

E0.2

BRANCH CIRCUIT VOLTAGE DROP WIRING SCHEDULE FOR SINGLE PHASE CIRCUITS						
BRANCH WIRE SIZE MAXIMUM BRANCH CIRCUIT LENGTH (IN FEET)						
CKT RATING (A)	(AWG)	120V	208V	240V	277V	480V
20A	12	83	143	165	191	331
	10	128	222	256	295	511
	8	201	348	402	464	804
	6	313	542	625	721	1250
30A	10	85	148	170	197	341
	8	134	232	268	309	536
	6	208	361	417	481	833
	4	313	542	625	721	1250

1. THE ABOVE TABLE VALUES ARE BASED ON COPPER CONDUCTORS, IN STEEL CONDUIT, WITH A LOAD POWER FACTOR

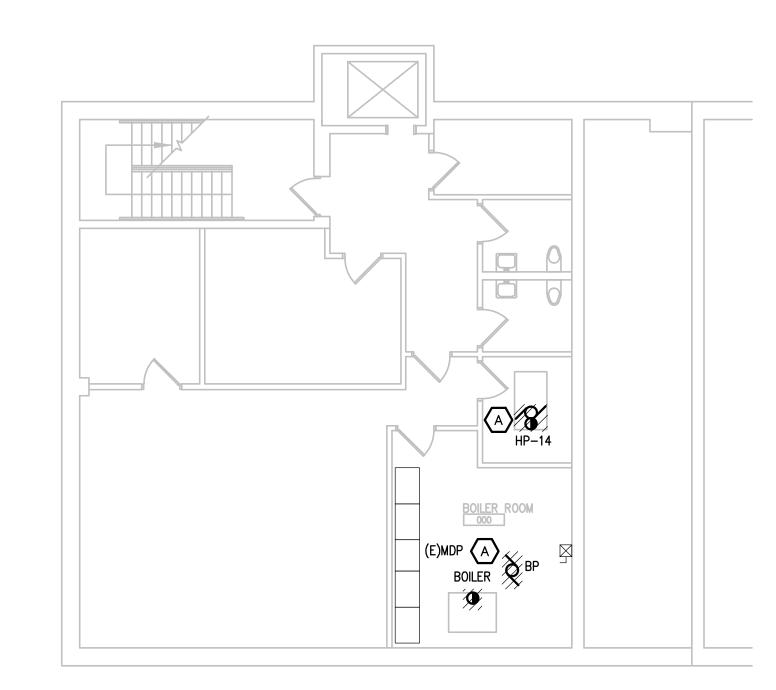
OF 0.85 PER NEC CHAPTER 9, TABLE 9. 2. PROVIDE BRANCH CIRCUIT CONDUCTORS AS INDICATED IN THE TABLE ABOVE FOR ALL LIGHTING AND RECEPTACLE BRANCH CIRCUITS. WHERE BRANCH CIRCUITS SERVE DEDICATED EQUIPMENT, THE CONTRACTOR MAY PERFORM VOLTAGE

DROP CALCULATIONS BASED ON ACTUAL EQUIPMENT CONNECTED LOAD AND PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3%.

3. CONDUCTOR SIZES ARE BASED ON MAXIMUM OF 9 CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT.
4. LIMITS FOR CONDUCTOR LENGTHS SHOWN ARE BASED ON A MAXIMUM BRANCH CIRCUIT LOADING OF 64% OF THE BRANCH BREAKER RATING AND A MAXIMUM OF 3 PERCENT VOLTAGE DROP TO COMPLY WITH ASHRAE 90.1 AND THE NEC. FOR CIRCUITS LOADED GREATER THAN 64% OF BRANCH BREAKER RATING, THE CONTRACTOR SHALL PROVIDE CONDUCTORS APPROPRIATELY SIZED TO LIMIT VOLTAGE DROP TO 3%.



FIRST FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 1/8" - 1' - 0"





LOWER LEVEL ELECTRICAL DEMOLITION PLAN
SCALE: 1/8' - 1' - 0'

### **GENERAL NOTES:**

- VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
- 2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
- 3. REMOVE LIGHTING FIXTURES AND ELECTRICAL DEVICES AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE DEVICES SHOWN.
- 4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
- 5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
- 6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
- 7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
- 8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
- 9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
- 10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
- 11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
- 12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
- 13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

### **#** DEMOLITION NOTES:

A. DISCONNECT AND REMOVE POWER FOR MECHANICAL EQUIPMENT. EXISTING CIRCUITING SHALL REMAIN FOR REUSE.



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PROJECT TITLE Administration **Building Upgrades** 

Plymouth-Canton Community Schools

DRAWING TITLE LOWER AND FIRST FLOOR **ELECTRICAL DEMOLITION PLANS** 

ISSUE DATES	

 -	

01-19-2017 BIDS

CHECKED SC APPROVED **GJZ** 

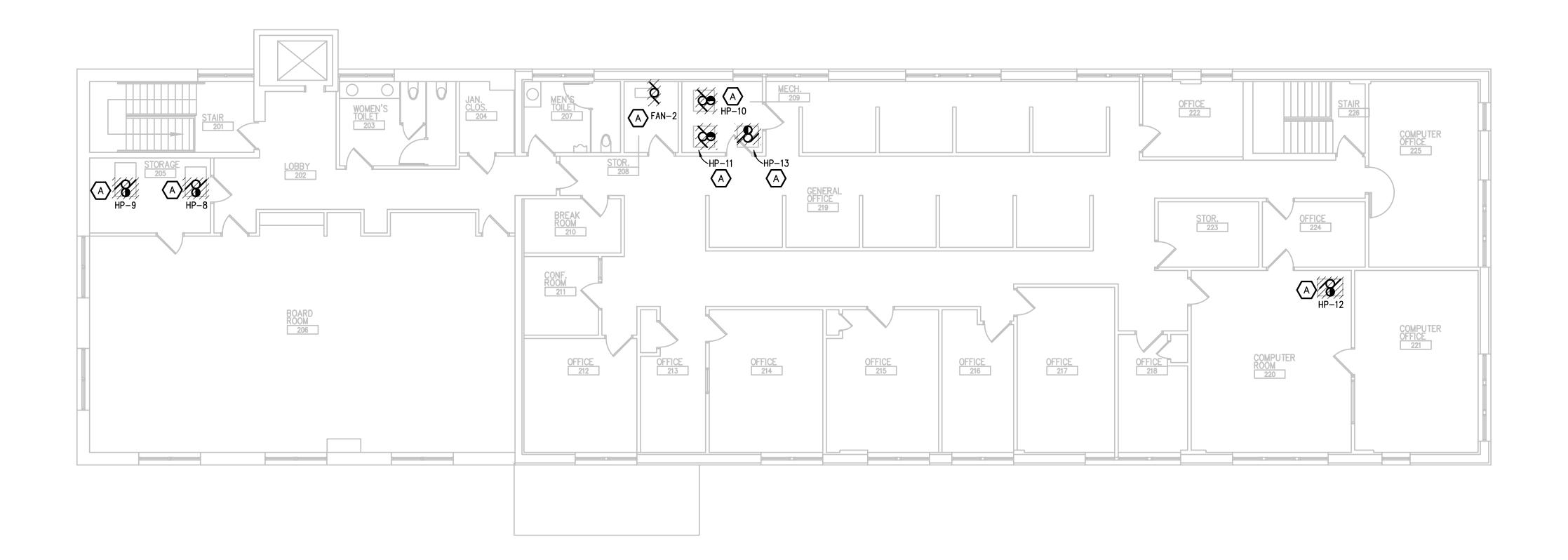
PROJECT NO.

13089E

DRAWING NO.

ED1.1

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE.





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

### **GENERAL NOTES:**

- VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
- 2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
- 3. REMOVE LIGHTING FIXTURES AND ELECTRICAL DEVICES AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE DEVICES SHOWN.
- 4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
- 5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
- 6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
- 7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
- 8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
- 9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
- 10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
- 11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
- 12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
- 13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

### **#** DEMOLITION NOTES:

A. DISCONNECT AND REMOVE POWER FOR MECHANICAL EQUIPMENT. EXISTING CIRCUITING SHALL REMAIN FOR REUSE.



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PROJECT TITLE Administration Building Upgrades

Plymouth-Canton Community Schools

DRAWING TITLE SECOND FLOOR **ELECTRICAL DEMOLITION** PLAN


ISSUE DATES

01-19-2017 BIDS

CHECKED SC

APPROVED **GJZ** 

PROJECT NO.

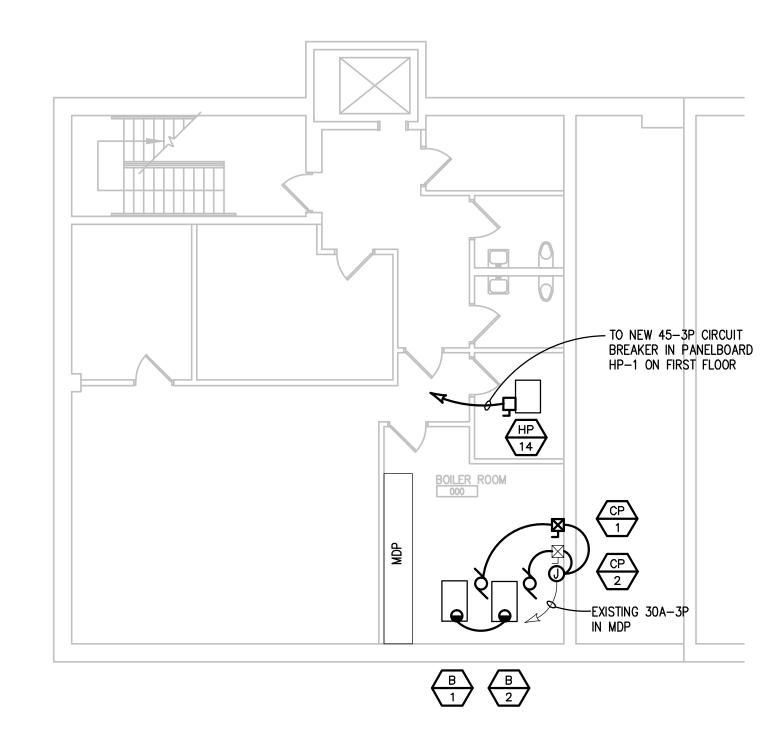
DRAWING NO.

13089E

ED1.2



FIRST FLOOR ELECTRICAL NEW WORK PLAN
SCALE: 1/8" - 1" - 0"





LOWER LEVEL ELECTRICAL NEW WORK PLAN
SCALE: 1/8' - 1' - 0'

### **GENERAL NOTES:**

- 1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- 2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- 3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- 4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL
- 5. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
- 6. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
- 7. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.

### **#** CONSTRUCTION KEY NOTES:

- 1. CONNECT TO NEAREST AVAIABLE 120V CIRCUIT.
- 2. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 3. PROVIDE NEW 15A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 4. PROVIDE NEW 20A-3P CIRCUIT BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 5. PROVIDE NEW 25A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 6. PROVIDE NEW 35A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.



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PROJECT TITLE Administration **Building Upgrades** 

Plymouth-Canton Community Schools

DRAWING TITLE LOWER LEVEL AND FIRST FLOOR ELECTRICAL NEW **WORK PLANS** 

ISSUE DATES	


01-19-2017 BIDS

CHECKED SC

APPROVED **GJZ** 

PROJECT NO. 13089E

DRAWING NO.

E2.1

THE FOLLOWING DIMENSION EQUALS

ONE INCH WHEN PRINTED TO SCALE.





SECOND FLOOR ELECTRICAL NEW WORK PLANS
SCALE: 1/8" - 1" - 0"

**GENERAL NOTES:** 

- 1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
- INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
- COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
- 4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL
- MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
- 6. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
- 7. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.

### **#** CONSTRUCTION KEY NOTES:

- 1. CONNECT TO NEAREST AVAIABLE 120V CIRCUIT.
- 2. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 3. PROVIDE NEW 15A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 4. PROVIDE NEW 20A-3P CIRCUIT BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 5. PROVIDE NEW 25A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.
- 6. PROVIDE NEW 35A-3P BREAKER IN EXISTING HP-1. CONNECT TO EXISTING DISCONNECT AND BRANCH CIRCUIT. EXTEND CIRCUITING AS REQUIRED.



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