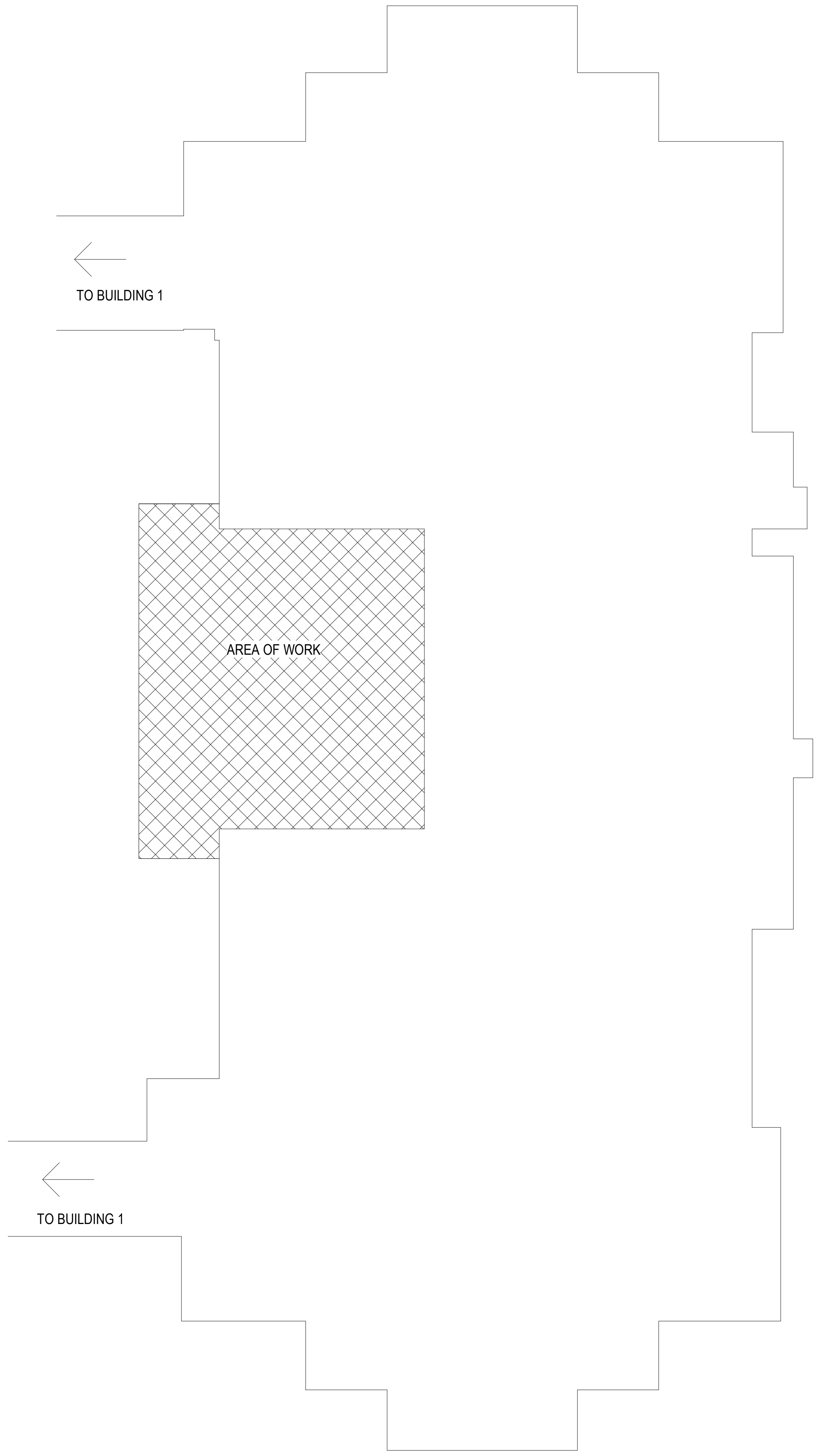
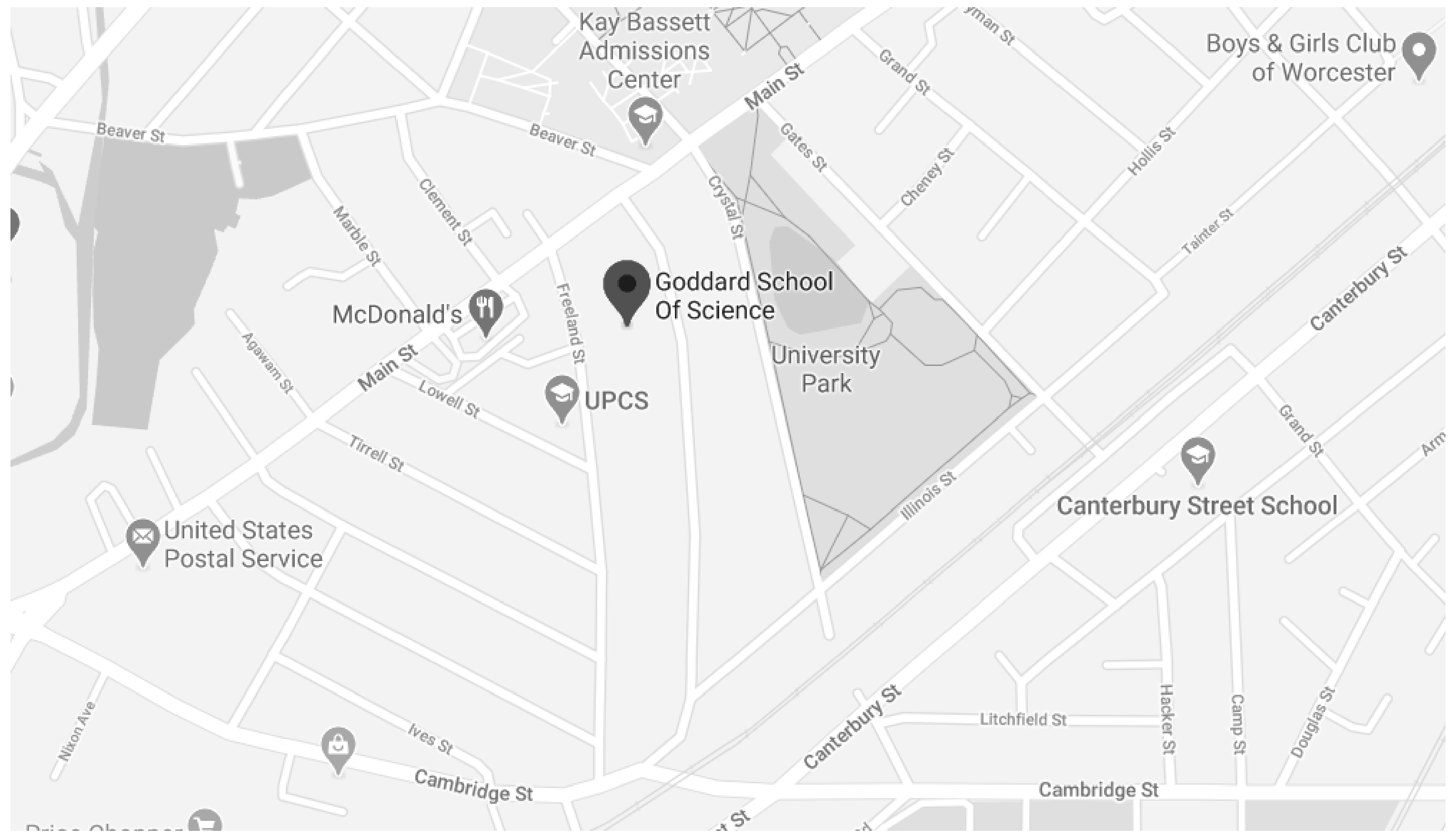
GODDARD SCHOOL BOILER REPLACEMENT
CITY OF WORCESTER

14 Richards St., Worcester, MA 01603





project location

drawing list

MECHANICAL

C-001	cover
MN-001	general mechanical legend, notes and abbreviations
MN-002	mechanical specifications
EN-002	electrical specifications
MD-101	first floor mechanical piping demolition plan
M-101	first floor mechanical piping plan
M-201	mechanical demo isometrics
M-202	mechanical new work isometrics
M-401	mechanical schedules and details

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD SCHOOL BOILER REPLACEMENT

CITY OF WORCESTER

14 Richards St., Worcester, MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:
DD 100%	02.05.2021	Design Development 100%	

cover

date:
04.20.21

project number:
cow-5725

scale:
As indicated

drawing number:

C-001

mechanical abbreviations

AFF	ABOVE FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
BDD	BACK DRAFT DAMPER
C	COMMON
CFM	CUBIC FEET PER MINUTE
DEG	DEGREE
D	DRAIN
DIA	DIAMETER
Ø	DIAMETER
DCW	DOMESTIC COLD WATER
DN	DOWN
DWG	DRAWING
DX	DIRECT EXPANSION
EB	ELECTRIC BASEBOARD
ECUH	ELECTRIC CABINET UNIT HEATER
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EFF	EFFICIENCY
ESP	EXTERNAL STATIC PRESSURE
FLR	FLOOR
FT	FEET
GC	GENERAL CONTRACTOR
HW	HOT WATER
HWR	HOT WATER RETURN
IN	INCHES
LAT	LEAVING AIR TEMPERATURE
LD	LOUVERED DOOR
M	MOTORIZED DAMPER
MC	MECHANICAL CONTRACTOR
MAX	MAXIMUM
MBH	1000 BTU/HOUR
MECH	MECHANICAL
MFGR	MANUFACTURER
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NO	NUMBER
#	NUMBER
OA	OUTSIDE AIR
PC	PLUMBING CONTRACTOR
RA	RETURN AIR
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SQ. FT	SQUARE FEET
TR	TRANSFER
TYP	TYPICAL
UC	UNDERCUT DOOR
UH	UNIT HEATER
V	VOLTS
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
W	WIDTH
WC	WATER COLUMN
X	EXISTING TO BE REMOVED
XM	EXISTING TO REMAIN
XR	EXISTING TO BE RELOCATED
XL	NEW LOCATION OF RELOCATED EQUIPMENT

hanger and support notes:

1. SEISMIC BRACING, WHERE REQUIRED, SHALL BE DESIGNED AND INSTALLED BY THE CONTRACTOR.

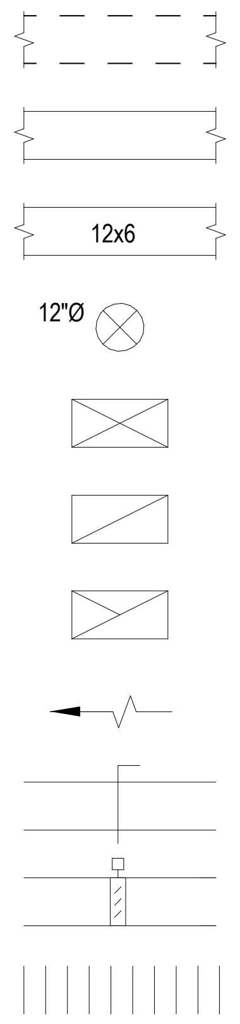
2. PIPE HANGERS AND SUPPORTS SHALL COMPLY WITH MSS SP-58 AND ASME B31.1, AND SHALL BE LOCATED AS NECESSARY TO PREVENT ANY EQUIPMENT CONNECTION FROM CARRYING THE WEIGHT OF PIPING COMPONENTS. THE USE OF SUPPLEMENTARY STRUCTURAL STEEL FRAMING MAY BE REQUIRED TO MEET THIS REQUIREMENT.

3. PIPE HANGERS:
3.1. GRINNELL FIG. 260, 300, ADJ. CLEVIS TYPE OR APPROVED EQUAL.
3.2. FRICTION CLAMP, GRINNELL FIG. 261, 40, 103 OR APPROVED EQUAL.
3.3. EXISTING HANGERS SHALL NOT BE RE-USED.
3.4. HANGERS SHALL BE ATTACHED DIRECTLY TO BUILDING STRUCTURES AND NOT TO OTHER PIPING.
3.5. HANGERS SHALL BE SIZED FOR INSULATION AND INCLUDE FIG. 160 AND 167
3.6. PROTECTION SADDLES WHERE APPLICABLE.
3.7. REQUIREMENTS FOR SUPPLEMENTARY STEEL FRAMING, IF NECESSARY TO SUPPORT PIPING OR EQUIPMENT, SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER FOR APPROVAL. FABRICATION AND INSTALLATION OF SUCH FRAMING IS THE CONTRACTOR'S RESPONSIBILITY. NOTE: UNISTRUT OR OTHER LIGHTWEIGHT BRACING IS GENERALLY NOT ACCEPTABLE FOR THIS APPLICATION.

4. BEAM CLAMPS:
4.1. STEEL C CLAMP (WITH LOCKING NUTS ON CLAMP AND HANGER ROD),
4.2. GRINNELL FIG 95 WITH FIG. 96 RETAINING CLIP, OR APPROVED EQUAL, FOR LINE SIZES UP TO AND INCLUDING 2 1/2".
4.3. MALLEABLE BEAM CLAMP, GRINNELL FIG. 218 OR APPROVED EQUAL, FOR LINE SIZES ABOVE 2 1/2".
4.4. EXISTING CLAMPS SHALL NOT BE RE-USED.

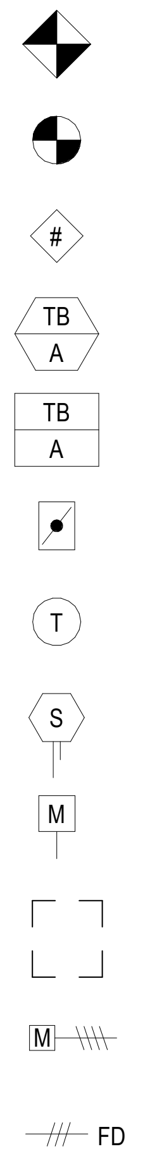
5. IN ORDER TO PREVENT THE POSSIBILITY OF CLEVIS HANGERS BECOMING LOOSE DUE TO BUILDING OR PIPE VIBRATION, BOTH OF THE FOLLOWING METHODS SHALL BE USED:
5.1. DOUBLE NUT THE CLEVIS ROD AND HANGER ROD. APPLY LOCTITE 242/243 THREAD LOCKING COMPOUND TO ALL HANGER HARDWARE.

duct & fitting legend



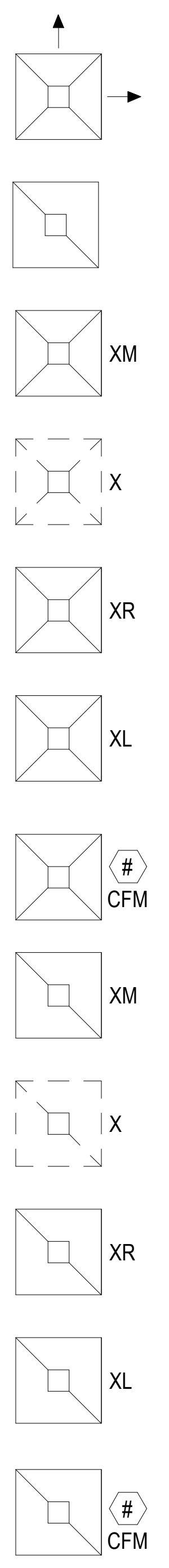
EXISTING DUCT TO BE REMOVED
NEW DUCT
WIDTH x DEPTH (FREE AREA)
ROUND DUCT INSIDE DIAMETER (FREE AREA)
SUPPLY AIR DUCT
RETURN AIR DUCT
EXHAUST AIR DUCT
DIRECTION OF AIR FLOW
VOLUME DAMPER - MANUAL
MOTORIZED DAMPER
FLEX DUCT

general mechanical legend



POINT OF DISCONNECT
POINT OF NEW CONNECTION
SHEET SPECIFIC KEYED NOTES
EQUIPMENT CALLOUT REQUIRING ELECTRICAL SERVICE
EQUIPMENT CALLOUT NOT REQUIRING ELECTRICAL SERVICE
TERMINAL BOX
THERMOSTAT
DUCT SMOKE DETECTOR
MOTOR ACTUATOR
REQUIRED EQUIPMENT CLEARANCE
OPPOSED BLADE DAMPER
FIRE DAMPER

grille & diffuser legend



SUPPLY AIR DIFFUSER
ARROW INDICATES DIRECTION OF FLOW

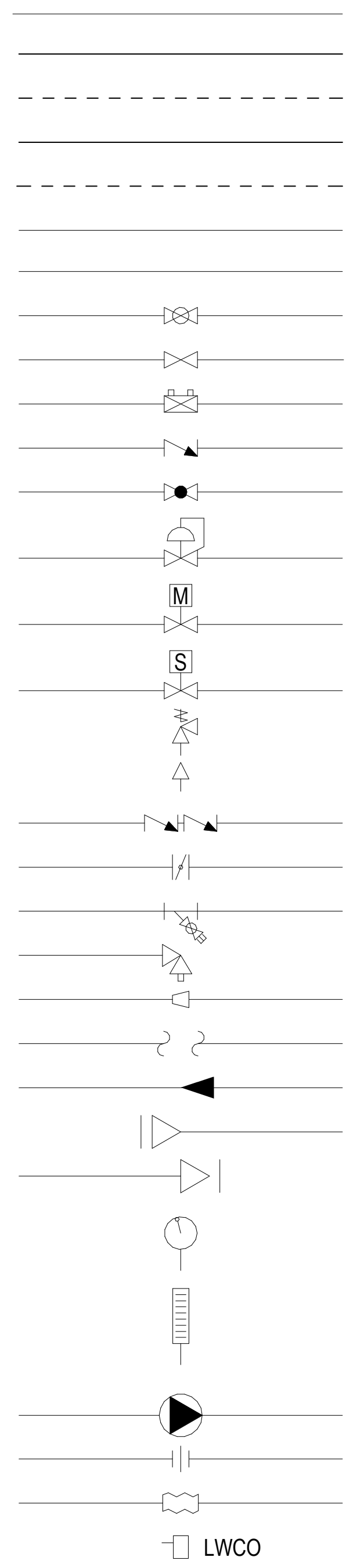
GENERAL RETURN AIR GRILLE
EXISTING SUPPLY DIFFUSER REMAINING
EXISTING SUPPLY DIFFUSER TO BE REMOVED
EXISTING SUPPLY DIFFUSER RELOCATED
NEW LOCATION OF RELOCATED RETURN GRILLE

NEW SUPPLY DIFFUSER
SEE SCHEDULE FOR CALL OUT DESIGNATION

EXISTING RETURN GRILLE REMAINING
EXISTING RETURN GRILLE TO BE REMOVED
EXISTING RETURN GRILLE RELOCATED
NEW LOCATION OF RELOCATED RETURN GRILLE

NEW RETURN GRILLE
SEE SCHEDULE FOR CALL OUT DESIGNATION

piping legend



OIL LINE
CHILLED WATER SUPPLY
CHILLED WATER RETURN
HOT WATER SUPPLY
HOT WATER RETURN
CONDENSATE DRAIN
ELECTRICAL CONNECTION
BALL VALVE
GATE VALVE
BALANCING VALVE
CHECK VALVE
GLOBE VALVE
PRESSURE REDUCING VALVE
MOTORIZED OR CONTROL VALVE
SOLENOID VALVE
RELIEF VALVE (PRESSURE OR T&P)
VENT
BACKFLOW PREVENTER
BUTTERFLY VALVE
STRAINER W/ BLOWOUT
BOILER DRAIN
REDUCER
PIPE BREAK
DIRECTION OF FLOW
FLOW STARTING ON THIS SHEET
FLOW ENDING ON THIS SHEET
PRESSURE GAUGE
THERMOMETER
PUMP
UNION
FLEXIBLE CONNECTOR
LOW WATER CUT OUT

general mechanical notes

1. WORK, MATERIALS, AND EQUIPMENT SHALL COMPLY WITH THE MOST RESTRICTIVE OF LOCAL, STATE, AND FEDERAL AUTHORITIES' CODES AND ORDINANCES OR THESE PLANS AND SPECIFICATIONS AS A MINIMUM, THE INSTALLATION SHALL COMPLY WITH THE CURRENT EDITIONS IN EFFECT 30 DAYS PRIOR TO THE RECEIPT OF BIDS .THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY PERMITS AND BE RESPONSIBLE FOR PAYMENT OF SAME ON ALL WORK WITHIN THIS CONTRACT. CONTRACTOR SHALL BE RESPONSIBLE TO MAKE CHANGES AS REQUESTED BY THE AHJ.

2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.

3. ALL FIELD CONDITIONS SHALL BE VERIFIED PRIOR TO BIDDING, PROPOSING, OR BEGINNING ANY WORK. CHANGES RESULTING FROM CONDITIONS ARISING IN THE FIELD ARE TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.COORDINATE ALL WORK OR ADJUST SAME TO THAT OF OTHER TRADES AND TO COMPENSATE FOR EXISTING CONDITIONS IN ORDER THAT CONFLICTS IN SPACE LOCATIONS DO NOT OCCUR. CONTRACTOR SHALL COORDINATE AND MAKE ACCOMMODATIONS FOR CONFLICTS AT NO COST TO THE OWNER.

4. THE CONTRACTOR SHALL PROVIDE THE MANUFACTURER AND MODEL OF EQUIPMENT INDICATED IN THE SCHEDULES. WHERE INDICATED "BASIS OF DESIGN" OR "ENGINEERING APPROVED EQUALS", CONTRACTOR SHALL SUBMIT ON EQUIPMENT THAT MEETS OR EXCEEDS THE QUALITY AND PERFORMANCE OF THE EQUIPMENT SHOWN ON THE DESIGN DRAWINGS.

5. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND/OR OTHER SUBMITTALS ON EQUIPMENT, COMPONENTS, AND CONTROLS TO BE INSTALLED OR PROVIDED. NO WORK MAY BEGIN ON ANY SEGMENT OF THIS PROJECT UNTIL SUBMITTALS HAVE BEEN APPROVED FOR CONFORMITY WITH DESIGN INTENT. WHEN MANUFACTURER'S CUT SHEETS APPLY TO A PRODUCT SERIES RATHER THAN A SPECIFIC PRODUCT, THE DATA SPECIFICALLY APPLICABLE TO THE PROJECT SHALL BE HIGHLIGHTED OR CLEARLY INDICATED BY OTHER MEANS. EACH SUBMITTED PIECE OF LITERATURE AND DRAWING SHALL CLEARLY REFERENCE THE SPECIFICATION AND/OR DRAWING THAT THE SUBMITTAL IS TO COVER. GENERAL CATALOGS SHALL NOT BE ACCEPTED AS CUT SHEETS TO FULFILL SUBMITTAL REQUIREMENTS. SELECT AND SHOW SUBMITTAL QUANTITIES APPROPRIATE TO SCOPE OF WORK. SUBMITTAL APPROVAL DOES NOT RELIEVE CONTRACTOR OF RESPONSIBILITY TO SUPPLY SUFFICIENT QUANTITIES TO COMPLETE WORK.

6. IT IS THE INTENT OF THE CONTRACT DRAWINGS AND SPECIFICATIONS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. ALL MATERIALS SHALL BE OF FIRST QUALITY AND SIMILAR TO EXISTING WHERE INTERFACING.

7. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE. ALL MATERIAL, WORK, INCIDENTAL ACCESSORIES, OR OTHER DETAILS NOT SHOWN BUT NECESSARY TO MAKE THE WORK COMPLETE AND PERFECT, AND IN ALL RESPECTS READY FOR OPERATION, EVEN IF NOT SPECIFIED, ARE TO BE PROVIDED AT NO COST TO THE OWNER.

8. ALL WORK SHALL BE PERFORMED BY QUALIFIED TRADESMEN IN ACCORDANCE WITH REQUIREMENTS OF GOVERNING CODES AND ACCEPTED PRACTICES.

9. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

10. UPON COMPLETION OF THE WORK UNDER THIS CONTRACT, THE CONTRACTOR SHALL REMOVE ALL TOOLS, APPLIANCES, SURPLUS MATERIALS, AND SCRAP LEAVING HIS WORK IN A PERFECT CONDITION AND THE AREA CLEAN AND READY FOR OCCUPATION.

11. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

12. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL. CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.

13. LOCATE ALL TEMPERATURE, PRESSURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTIONS OF PIPE OR DUCT UP- AND DOWN STREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.

14. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.

15. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS.

16. COORDINATE AND PROVIDE ALL DUCTWORK AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.

17. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

18. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED, AND REQUIRED TO PROVIDE A VIBRATION FREE INSTALLATION.

19. CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY CLEANUP AND THE PROPER LEGAL DISPOSAL OF ALL DEMOLISHED EQUIPMENT AND DEBRIS CREATED BY THEIR WORK.

20. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL REQUIRED PENETRATIONS IN WALLS, CEILINGS, FLOORS, AND ROOF WITH GENERAL CONTRACTOR. ALL PENETRATIONS SHALL BE FIRE STOPPED AS REQUIRED BY CODE.

21. ALL DUCTWORK DIMENSIONS, AS SHOWN ON DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.

22. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.

23. MAKE ALL REQUIRED ADJUSTMENTS TO EQUIPMENT, AIR DEVICES, AND WATER FLOWS UNTIL ALL SPECIFIED PERFORMANCES ARE MET TO WITHIN +/-5%. ALL AIR AND WATER SYSTEMS SHALL BE BALANCED ACCORDING TO THE PLANS. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH AABC STANDARDS. BALANCE REPORT(S) SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL.

24. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH NATIONAL ELECTRIC CODE AND APPLICABLE SPECIFICATION SECTIONS.

25. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

26. MECHANICAL CONTRACTOR SHALL FURNISH ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES. SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO GENERAL CONTRACTOR FOR INSTALLATION.

27. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED AS REQUIRED BY CODE.

28. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.

29. ALL DUCTWORK, PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURE SHALL BE COORDINATED WITH GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.

30. MECHANICAL EQUIPMENT SHALL NOT BE SUPPORTED FROM METAL DECK.

31. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPE INSULATION IS APPLIED.

32. UNLESS OTHERWISE NOTED, ALL HEATING WATER PIPING SHALL BE 1 INCH NOMINAL SIZE.

33. UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO UNDERSIDE OF STRUCTURE, SLAB, OR DECK, WITH SPACE FOR INSULATION IF REQUIRED.

34. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

35. ALL VALVES SHALL BE INSTALLED SO THAT VALVES REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING ON EQUIPMENT SIDE OF VALVE IS REMOVED.

36. ALL BALANCE VALVES AND BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS AND MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).

37. ALL VALVES (EXCEPT CONTROL VALVES) AND STRAINERS SHALL BE FULL SIZE OF PIPE BEFORE REDUCING SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.

38. INSTALL ALL PIPE WITHOUT FORCING OR SPRINGING.

39. ALL PIPING SHALL CLEAR DOORS AND WINDOWS.

40. ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.

41. PROVIDE AN AIR VENT AT THE HIGH POINT OF EACH DROP IN HEATING WATER AND OTHER CLOSED WATER PIPING SYSTEMS. PROVIDE HOSE END DRAIN VALVES AT THE BOTTOM OF ALL RISERS AND LOW POINTS.

42. ALL PIPING AND DUCT WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

43. UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FEET OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATION AND REPAIRS.

44. ALL PIPING SHALL GRADE TO LOW POINTS.

45. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS AND HUMIDISTATS 4'-6” (CENTERLINE) ABOVE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE ABOVE LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS QUESTION ON THE LOCATION.

46. INSTALL BALANCE DAMPERS AT EVERY BRANCH CONNECTION OF THE NEW AND EXIST. SUPPLY AND RETURN DUCTWORK.

47. FLEXIBLE DUCT SHALL BE INSULATED, CLASS 1 AIR DUCT, 4 FEET MAXIMUM LENGTH. INSTALL PER SMACNA AND MANUFACTURER REQUIREMENTS. FLEXIBLE DUCT SHALL NOT BE USED TO CHANGE THE DIRECTION OF AIRFLOW.

48. DURING CONSTRUCTION, OPEN DUCTWORK COMMUNICATING WITH OCCUPIED AREAS SHALL BE TEMPORARILY SEALED TO PREVENT DUST AND DEBRIS FROM TRAVELING INTO THE OCCUPIED AREAS OR BECOMING TRAPPED IN THE DUCTWORK.

49. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.

50. COORDINATE DUCTWORK WITH STRUCTURAL MEMBERS AND OTHER INSTALLED EQUIPMENT ABOVE CEILINGS. ADJUST DUCTWORK AS NECESSARY TO ACCOMMODATE OBSTRUCTIONS AND CLEARANCES. COORDINATE ADJUSTMENTS ON RECORD DRAWINGS (AS-BUILTS).

52. FURNISH REPRODUCIBLE RECORD DRAWINGS UPON WHICH CORRECTIONS HAVE BEEN INCLUDED TO PROVIDE AN ACCURATE AND COMPLETE RECORD OF THE WORK AS INSTALLED. ALL DUCTWORK, EQUIPMENT, PIPING, AND ADJUSTABLE DEVICES SHALL BE INCLUDED AND DIMENSIONED ON THE RECORD DRAWINGS.

53. ALL WORK IS TO BE FREE OF DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF NO LESS THAN ONE YEAR, UNLESS OTHERWISE INDICATED, FROM THE DATE OF FINAL ACCEPTANCE. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED

edm

architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by: PC
approved by: RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:
DD 100%	02.05.2021	Design Development 100%	

general mechanical legend,
notes and abbreviations

date: 04.20.21
project number: cow-5725
scale: NTS
drawing number:

MN-001

<u>MECHANICAL SPECIFICATIONS DIVISION 23</u>

HVAC CONTRACTOR TO BE PRIME CONTRACTOR.

MECHANICAL GENERAL PROVISIONS

1. THE REQUIREMENTS OF THIS SPECIFICATION ARE FOR WORK RELATED TO DIVISION 23 (HVAC) SPECIFICATION.
2. THE PROVISIONS OF THE INSTRUCTIONS TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, ALTERNATES, ADDENDA AND DIVISION 1 ARE A PART OF THIS SPECIFICATION. PLUMBING, FIRE SUPPRESSION, HVAC, ELECTRICAL, ARCHITECTURAL, STRUCTURAL AND ALL OTHER DRAWINGS AS WELL AS THE SPECIFICATIONS FOR ALL THE DIVISIONS ARE A PART OF THE CONTRACT DOCUMENTS.
3. VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH THE CONDITIONS AFFECTING THE INSTALLATION. SUBMISSION OF A PROPOSAL SHALL PRESUME KNOWLEDGE OF SUCH CONDITIONS AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED WHERE EXTRA LABOR OR MATERIALS ARE REQUIRED.
4. INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, SERVICES AND PERMITS NECESSARY FOR THE PROPER COMPLETION OF ALL MECHANICAL WORK SHOWN. ITEMS OMITTED, BUT NECESSARY, TO MAKE THE MECHANICAL SYSTEMS COMPLETE AND WORKABLE SHALL BE UNDERSTOOD TO BE PART OF THE WORK.
5. IT IS THE PURPOSE OF THE MECHANICAL DRAWINGS TO INDICATE THE APPROXIMATE LOCATION OF ALL EQUIPMENT, DUCTWORK, PIPING, ETC. DETERMINE EXACT LOCATIONS OF EQUIPMENT AND ARRANGE WORK ACCORDINGLY. THE RIGHT IS RESERVED TO EFFECT REASONABLE CHANGES IN THE LOCATION OF EQUIPMENT, PIPING, ETC., UP TO THE TIME OF ROUGHING-IN, WITHOUT ADDITIONAL COST TO THE OWNER.
6. SECURE AND PAY FOR PERMITS AND INSPECTIONS REQUIRED FOR THE MECHANICAL WORK.
7. INSTALL WORK IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF LOCAL AND STATE CODES, AS WELL AS THE NFPA AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION. COMPLY WITH THE LATEST EDITIONS OF ASHRAE AND SMACNA STANDARDS.
8. CONSULT THE DRAWINGS, PRODUCT DATA AND SHOP DRAWINGS COVERING THE WORK FOR VARIOUS OTHER TRADES, THE FIELD LAYOUTS OF THE CONTRACTORS FOR THE TRADE AND MAKE ADJUSTMENTS ACCORDINGLY IN LAYING OUT THE MECHANICAL WORK.
9. WARRANT THAT EQUIPMENT AND ALL WORK IS INSTALLED IN ACCORDANCE WITH GOOD (FIRST CLASS) PRACTICE AND THAT ALL EQUIPMENT WILL MEET THE REQUIREMENTS SPECIFIED. GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS; REPAIR OR REPLACE ANY DEFECTIVE WORK, MATERIAL OR EQUIPMENT WITHIN ONE YEAR FROM DATE OF FORMAL WRITTEN ACCEPTANCE BY THE OWNER. ALL WORK SHALL BE PERFORMED BY QUALIFIED TRADES-MEN IN ACCORDANCE WITH REQUIREMENTS OF GOVERNING CODES AND ACCEPTED PRACTICES.
10. PLAN WORK TO PERMIT THE CARRYING ON OF NORMAL BUSINESS FUNCTIONS. ANY SERVICE SHUTDOWNS THAT MAY BE REQUIRED SHALL BE SCHEDULED THROUGH THE OWNER AND SHALL BE DONE AT A TIME AS DIRECTED BY THE OWNER. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED FOR THESE SHUTDOWN PERIODS EVEN THOUGH PREMIUM-TIME WORK MAY BE REQUIRED. PROVIDE TEMPORARY SERVICE TO EQUIPMENT OR SYSTEMS THAT CANNOT BE SHUTDOWN, AS DETERMINED BY OWNER. PROVIDE A MINIMUM OF ONE WEEK'S NOTICE TO THE OWNER BEFORE ANY SERVICE SHUTDOWN IS SCHEDULED.
11. PROVIDE TEMPORARY SERVICES OF ANY NATURE REQUIRED TO KEEP BUILDING FUNCTIONING. REMOVE TEMPORARY SERVICES WHEN PERMANENT FACILITIES ARE COMPLETED.
12. BASE BIDS UPON THE SPECIFIED PRODUCTS OR LISTED ALTERNATIVES. THE DRAWINGS AND SPECIFICATIONS ARE BASED ON THE PRODUCTS SPECIFIED BY TYPE, MODEL AND SIZE AND THUS ESTABLISH MINIMUM QUALITIES WHICH SUBSTITUTES MUST MEET TO QUALIFY FOR REVIEW. WHERE ONLY ONE MAKE IS NAMED, IT SHALL BE PROVIDED. VERBAL REQUESTS OR APPROVALS SHALL NOT BE BINDING ON THE ARCHITECT, ENGINEER OR OWNER. SHOULD MATERIALS AND EQUIPMENT OTHER THAN THOSE SPECIFIED BE PROPOSED, SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS TO THE ARCHITECT IN ACCORDANCE WITH DIVISION 1 REQUIREMENTS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE. EQUIPMENT AND MATERIALS USED ON THIS PROJECT SHALL BE NEW AND UL LABELED (AS REQUIRED) FOR THE APPLICATION.
13. PREPARE SHOP DRAWINGS AND PRODUCT DATA FOR ALL SPECIFIED MECHANICAL EQUIPMENT, SYSTEMS, AND COMPONENTS. THE SUBMITTALS WILL BE REVIEWED ONLY FOR GENERAL COMPLIANCE AND NOT FOR DIMENSIONS, QUANTITIES, ETC. THE SUBMITTALS THAT ARE RETURNED SHALL BE USED FOR PROCUREMENT. THE RESPONSIBILITY OF CORRECT PROCUREMENT REMAINS SOLELY WITH THE CONTRACTOR. THE SUBMITTAL REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS AND DEVIATIONS FROM THE CONTRACT REQUIREMENTS. IF THE SUBMITTAL SHOWS VARIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS FOR ANY REASON, MAKE MENTION OF SUCH VARIATION IN THE LETTER OF TRANSMITTAL. NOTE ON THE SUBMITTAL ANY CHANGE IN DESIGN OR DIMENSIONON THE ITEMS SUBMITTED INCLUDING CHANGES MADE BY THE MANUFACTURER WHICH MAY DIFFER FROM CATALOG INFORMATION. WHERE CONTENTS OF SUBMITTAL LITERATURE INCLUDES DATA NOT PERTINENT TO THE SUBMITTAL, CLEARLY INDICATE WHICH PORTION OF CONTENT IS BEING SUBMITTED FOR REVIEW. WHERE ADDITIONAL INSTALLATION DRAWINGS OR OTHER DRAWINGS ARE SPECIFIED AS A PART OF THE SUBMITTAL, THEY SHALL BE SUBMITTED AT THE SAME TIME WITH SHOP DRAWINGS AND PRODUCT DATA. PARTIAL SUBMITTALS ARE NOT ACCEPTABLE.
14. KEEP ONE COMPLETE SET OF THE CONTRACT WORKING DRAWINGS ON THE PROJECT SITE ON WHICH THE CONTRACTOR SHALL RECORD ANY DEVIATIONS OR CHANGES FROM SUCH CONTRACT DRAWINGS MADE DURING CONSTRUCTION. AFTER THE PROJECT IS COMPLETED, RECORD SETS OF DRAWINGS SHALL BE DELIVERED TO THE ARCHITECT IN GOOD CONDITION, AS A PERMANENT RECORD OF THE INSTALLATION AS CONSTRUCTED.
15. PROVIDE TO OWNER AFTER ALL EQUIPMENT IS IN OPERATION, COMPETENT INSTRUCTORS FOR THE PURPOSE OF TRAINING OWNER'S PERSONNEL IN ALL PHASES OF OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS. FURNISH FIVE BOUND COPIES OF SERVICE MANUALS CONTAINING OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT AND CONTROL.
16. IDENTIFY ALL PIPING IN EXPOSED LOCATIONS, ABOVE ACCESSIBLE CEILINGS AND IN ACCESSIBLE SHAFTS WITH LABELS AND COLOR BANDS AS MANUFACTURED BY THE SETON NAMEPLATE COMPANY, MARKING SERVICES INC. OR EQUAL.
17. IDENTIFY EACH PIECE OF EQUIPMENT WITH EITHER STENCIL OR NAME PLATES WITH THE DESIGNATION INDICATED ON THE DESIGN DRAWINGS.
18. PROVIDE AN ENGRAVED BRASS VALVE TAG ON EACH SHUT-OFF VALVE, EXCEPT FOR LOCAL SHUT-OFFS TO EQUIPMENT. RECORD VALVE TAG NUMBER ON RECORD DRAWINGS.
19. AT ALL TIMES KEEP PREMISES AND BUILDING IN NEAT AND ORDERLY CONDITION; FOLLOW EXPLICITLY THE INSTRUCTIONS OF ARCHITECT IN REGARD TO STORING OF MATERIALS, PROTECTIVE MEASURES AND DISPOSING OF DEBRIS.
20. UPON COMPLETION OF THE WORK UNDER THIS CONTRACT, THE CONTRACTOR SHALL REMOVE ALL TOOLS, APPLIANCES, SURPLUS MATERIALS, AND SCRAP LEAVING HIS WORK IN A PERFECT CONDITION AND THE AREA CLEAN AND READY FOR OCCUPATION
21. TEST PIPING FOR LEAKS; REPAIR LEAKS IN COPPER TUBING BY SWEATING OUT JOINTS, THOROUGHLY CLEANING BOTH TUBE AND FITTING, AND RESOLDERING; CORRECT LEAKS IN SCREWED JOINTS BY REPLACING THREAD OR FITTING OR BOTH. PROVIDE CHEMICAL CLEANING FOR ALL PIPING SYSTEMS WITH APPROVED DETERGENT. PRESSURE TEST ALL PIPING SYSTEMS PER APPLICABLE CODES AND STANDARDS.
22. REMOVE ALL PREVIOUSLY ABANDONED EQUIPMENT AND PIPING ENCOUNTERED ABOVE EXISTING CEILINGS IN AREA OF WORK.
23. FINISH PAINTING IS INCLUDED UNDER DIVISION 9 EXCEPT WHERE SPECIFICALLYCALLED FOR ON THE DRAWINGS OR SPECIFICATIONS TO BE DONE BY THEMECHANICAL CONTRACTOR.
24. PROVIDE SERVICES OF A CERTIFIED AABC OR NEBB TEST AGENCY. CONDUCT ALL TESTS IN ACCORDANCE WITH ASSOCIATED AIR BALANCE COUNCIL STANDARDS. TEST AND ADJUST AIR HANDLING SYSTEM TO WITHIN 10 PERCENT OF DESIGN REQUIREMENTS. FURNISH 5 A.A.B.C. CERTIFIED COPIES OF BALANCING REPORTS.
25. ANY CORE DRILLING OR CUTTING OF FIRE RATED FLOORS, SHAFTS AND WALLS SHALL BE FIRE STOPPED PRIOR TO FINISH PATCHING. ALL PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH UL FIRE RESISTANCE DIRECTORY, VOLUME II, AND SHALL BE RATED TO MATCH THE FIRE RATING OF THE FLOORS, SHAFTS OR WALLS PENETRATED.
26. PROVIDE ALL CUTTING AND PATCHING IN EXISTING CONSTRUCTION ASNECESSARY FOR INSTALLATION OF THIS WORK. HAVE CUTTING DONE BY SKILLED MECHANICS IN THE TRADE.
27. DEMOLITION OF EXISTING MECHANICAL EQUIPMENT DUCTWORK AND PIPING IS APART OF THIS WORK AND SHALL BE AS INDICATED.
28. ALL OCCUPIED AREAS OF BUILDING SHALL REMAIN FREE FROM ODORS, FUMES, DUST AND SMOKE GENERATED FROM INSTALLATION OF MATERIAL AND EQUIPMENT. PROVIDE TEMPORARY VENTILATION AND/OR FILTRATION SYSTEMS OF SUFFICIENT SIZE AND QUANTITY TO ENSURE COMPLETE REMOVAL OF ALL AIRBORNE CONTAMINANTS GENERATED. PROVIDE TEMPORARY PARTITIONS AND AIR SEALS TO PREVENT THE MIGRATION OF AIRBORNE CONTAMINANTS FROM UNOCCUPIED AREAS TO OCCUPIED AREAS.
29. ALL HVAC SYSTEMS SHALL BE COMMISSIONED PER COMMISSIONING SECTION OF THESE SPECIFICATIONS.

A. PIPE AND FITTINGS

1. PIPE AND FITTINGS
    a. HYDRONIC AND DOMESTIC WATER PIPING - ASTM- A53 BLACK STEEL OVER 2". TYPE L HARD COPPER 1-1/2" AND SMALLER.
    b. STEAM AND CONDENSATE PIPING - ASTM- A53 BLACK STEEL, PLAIN ENDS, WELDED AND SEAMLESS, TYPE S, GRADE B, SCHEDULE 80.
    c. DRAIN PIPING - TYPE L HARD COPPER 1-1/2" AND SMALLER.
    d. GAS PIPING - ASTM A53/A53M, BLACK STEEL, SCHEDULE 40, TYPE E OR S, GRADE B.
    e. FITTINGS FOR COPPER PIPE: WROT COPPER SOLDER JOINT TYPE WITH 95-5TIN-ANTIMONY SOLDER.
    f. FITTINGS FOR BLACK STEEL PIPE: 125 PSIG, BLACK CAST IRON SCREWED FITTINGS THROUGH 2 INCH SIZE AND WELDED FOR SIZES OVER 2 INCH.
2. ALL VALVES SHALL BE OF THE SAME MANUFACTURER WHERE POSSIBLE AND SHALL BE AS MANUFACTURED BY MILWAUKEE, NIBCO, HAMMOND, OR WATTS. ALL VALVES SHALL BE OF DOMESTIC MANUFACTURER.
    a. VALVES IN WATER AND STEAM PIPING 2 INCH AND SMALLER: TWO-PIECE BRONZE BODY BALL VALVES, MIN.150 WSP, 600 WOG. MILWAUKEE BA-150. VALVES USED FOR BALANCING SHALL BE EQUIPPED WITH MEMORY STOP.
    b. VALVES IN WATER PIPING 2-1/2 INCH AND LARGER: BUTTERFLY TYPE, DUCTILE IRON BODY, 175 WOG, WITH MULTIPLE STOP THROTTLING LEVER HANDLES. MILWAUKEE CL123 SERIES. VALVES USED FOR BALANCING SHALL BE EQUIPPED WITH MEMORY STOP.
    c. VALVES IN STEAM PIPE 2-1/2 INCH AND LARGER: HIGH-PERFORMANCE BUTTERFLY VALVES, SINGLE FLANGE (LUG TYPE), CARBON-STEEL BODY, AND CLASS 150.
    d. STEAM TRAPS - FLOAT AND THERMOSTATIC, SUITABLE FOR INLET PRESSURES TO 30 PSIG. BRONZE ANGLE-PATTERN BODY WITH INTEGRAL UNION TAILPIECE AND SCREW-IN CAP, BALANCED PRESSURE, STAINLESS STEEL OR MONEL BELLOWS, REPLACEABLE, HARDENED STAINLESS STEEL HEAD AND SEAT, PRESSURE CLASS 125.
3. PROVIDE DIELECTRIC CONNECTIONS BETWEEN COPPER AND FERROUS METAL PIPING MATERIALS IN ALL SYSTEMS.
4. WHERE PIPES PASS THROUGH MASONRY OR CONCRETE WALLS, PROVIDE MACHINE CUT STEEL PIPE SLEEVE 1 INCH LARGER THAN OUTSIDE DIAMETER OF PIPE. WHERE FLOORS OR WALLS ARE CORE DRILLED, STEEL SLEEVES ARE NOT REQUIRED. PROVIDE FIRE STOPPING BETWEEN PIPE AND SLEEVE TO MAINTAIN FIRE RATING OF ALL WALLS AND FLOORS.
5. PROVIDE ALL INSERTS, HANGERS, ANCHORS, GUIDES AND SUPPORTS TO PROPERLY SUPPORT AND RETAIN PIPING, DUCTWORK, CONDUITS AND EQUIPMENT; TO CONTROL EXPANSION, CONTRACTION, ANCHORAGE, DRAINAGE AND PREVENT SWAY AND VIBRATION. PIPING SHALL BE SO SUPPORTED AS NOT TO PLACE A STRAIN ON VALVES OR EQUIPMENT.
6. REFER TO THOSE PORTIONS OF THE ELECTRICAL DRAWINGS AND SPECIFICATIONS WHICH ESTABLISH CHARACTERISTICS OF ELECTRICAL SERVICE AND FURNISH EQUIPMENT TO OPERATE ON THE SERVICE.
7. VIBRATION OR NOISE CREATED IN ANY PART OF THE BUILDING BY THE OPERATION OF ANY EQUIPMENT FURNISHED AND/OR INSTALLED UNDER THIS CONTRACT WILL BE PROHIBITED. TAKE ALL PRECAUTIONS BY ISOLATING THE VARIOUS ITEMS OF EQUIPMENT FROM THE BUILDING STRUCTURE.

B. PIPING INSULATION

1. ALL INSULATION MATERIAL (INSULATION, JACKETS, ADHESIVES, CEMENTS, MASTICS, SEALERS COATINGS AND FINISHES) SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS AS TESTED UNDER PROCEDURE ASTM E-84, NFPA 255AND UL 723, NOT EXCEEDING A FLAME SPREAD RATING OF 25 AND SMOKE DEVELOPED RATING OF 50.
2. PROVIDE INSULATION PRODUCTS AS MANUFACTURED BY OWENS-CORNING, ARMSTRONG, CERTAIN TEED, KNAUF OR JOHNS MANSVILLE. ADHESIVES SHALL BE BENJAMIN FOSTER OR EQUAL.
3. ALL INSULATION SHALL BE INSTALLED OVER CLEAN DRY SURFACES. INSULATION MUST BE DRY AND IN GOOD CONDITION. WET OR DAMAGED INSULATION WILL NOT BE ACCEPTABLE. NO INSULATION SHALL BE APPLIED PRIOR TO PRESSURE TEST COMPLETION OF THE RESPECTIVE PIPING SYSTEMS.
4. ALL INSULATION SHALL BE CONTINUOUS THROUGH ALL WALL AND CEILING OPENINGS, SLEEVES AND PIPE HANGER LOCATIONS.
5. INSULATE VALVE BONNETS, UNIONS, STRAINERS.
6. ALL INSULATION PRODUCTS SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS AND THIS SPECIFICATION. THE WORKMANSHIP SHALL BE FIRST CLASS AND ALL JOINTS SHALL BE MADE TIGHT.
7. THE FOLLOWING PIPE SYSTEMS SHALL BE INSULATED WITH MINERAL FIBER FIBERGLASS: ASJ/SSL-II HEAVY DENSITY ONE-PIECE PIPE INSULATION.THICKNESS OF INSULATION SHALL BE AS NOTED BELOW.
    a. HOT WATER PIPING -3/4" TO 1" = 11/2", 11/2" TO 8" = 2"
    b. STEAM & PIPING: 4" AND SMALLER = 2-1/2".
    c. STEAM CONDENSATE PIPING: 3/4" TO 1-1/4" = 1-1/2", 1-1/2" TO 8" = 2"
8. ALL HOT AND CHILLED PIPING INSULATION TO BE FINISHED WITH PVC JACKET. 20 MIL.

C. HVAC INSTRUMENTATION AND CONTROL (SECTION 23 09 00)

1. ALL WIRING INCIDENTAL TO THIS TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED BY THE CONTRACTOR.
2. WIRE, CONDUIT AND MISCELLANEOUS WIRING DEVICES SHALL BE PROVIDED AND INSTALLED AS SPECIFIED IN DIVISION 26 OF THIS SPECIFICATION. PLENUM RATED CABLE IS ACCEPTABLE FOR LOW VOLTAGE CONTROL WIRING IN RETURN AIR PLENUM SPACES.
3. SYSTEM SHALL BE COMPLETE WITH ALL REQUIRED CONTROL COMPONENTS, SUCH AS DAMPERS, VALVES, ACTUATORS, TERMINAL UNIT CONTROLLERS, SENSORS, CONTROL PANELS, THERMOSTATS, ETC., AS REQUIRED TO PROVIDE SPECIFIED SEQUENCE OF OPERATION.

D. HVAC EQUIPMENT

a. BOILERS SHALL BE MANUFACTURERS AND MODELS SCHEDULED ON THE PLANS. PROVIDE WITH OPTIONS SHOWN AND SCHEDULED.

E. VENTING

a. BOILER FLUE SHALL MATCH EXISTING MATERIAL AND GRADE.

edm

architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.	date:	issued for:	by:

mechanical specifications

date:
04.20.21

project number:
cow-5725

scale:
NTS

drawing number:

MN-002

DIVISION 26 - GENERAL PROVISIONS FOR ELECTRICAL WORK
GENERAL PROVISIONS FOR ELECTRICAL WORK

1. REFERENCES

- THIS SECTION COVERS THE GENERAL REQUIREMENTS FOR ELECTRICAL WORK; EXAMINE ALL CONTRACT DRAWINGS AND ALL OTHER SECTIONS OF THE SPECIFICATIONS FOR ADDITIONAL WORK RELATED TO THE WORK OF THIS DIVISION.

2. DEFINITIONS

- 'PROVIDE' - TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION OF PARTICULAR WORK REFERRED TO UNLESS, SPECIFICALLY OTHERWISE NOTED.
- 'INSTALL' - TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 'WORK' - LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 'WIRING' - RACEWAY, FITTINGS, WIRE, BOXES, MOUNTING HARDWARE AND RELATED ITEMS.
- 'CONCEALED' - EMBEDDED IN MASONRY OR OTHER CONSTRUCTION CAVITY, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS.
- 'SIMILAR' OR 'EQUAL' - EQUAL MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- 'CONTRACTOR' - THE ELECTRICAL CONTRACTOR.
- 'NOTED' - AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.

3. `SCOPE

- THIS WORK SHALL CONSIST OF THE FURNISHINGS OF ALL LABOR, MATERIALS AND SERVICES REQUIRED COMPLETE, READY FOR CORRECT OPERATION FOR ALL ELECTRICAL WORK CALL FOR BY THE ACCOMPANYING DRAWINGS AND SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES.
- THE DATA INDICATED IN THESE DRAWINGS AND SPECIFICATIONS ARE AS EXACT AS COULD BE SECURED. BUT THEIR ABSOLUTE ACCURACY IS NOT GUARANTEED. DO NOT SCALE DRAWINGS. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER CONDITIONS WILL BE GOVERNED BY THE BUILDING. USE THE DRAWINGS AND SPECIFICATIONS FOR GUIDANCE AND SECURE THE ENGINEER'S APPROVAL OF CHANGES IN LOCATIONS. CIRCUITS, WHERE SHOWN ON AN ELECTRICAL DRAWINGS, ARE SO INDICATED PRIMARILY FOR THE PURPOSE OF INDICATING THE GENERAL CIRCUIT PLAN AND DO NOT NECESSARILY INDICATE THE EXACT LOCATION OF ROUTING OF THE RACEWAYS UNLESS SPECIFICALLY INDICATED. CIRCUITS SHALL BE RUN IN SUIT CONDITIONS CONSIDERING STRUCTURAL FEATURES, OTHER TRADES, CONSTRUCTION METHODS AND GOOD INSTALLATION PRACTICE.
- BEFORE SUBMITTING A BID, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS UNDER WHICH THE WORK AND WORK OF OTHER TRADES WILL BE INSTALLED. CONTRACTOR SHALL INCLUDE ANY MODIFICATIONS REQUIRED IN EXISTING ELECTRICAL EQUIPMENT FOR INSTALLATION OF NEW ELECTRICAL EQUIPMENT AND NEW EQUIPMENT OF OTHER TRADES. (LIGHTING FIXTURES, DEVICES, CONDUIT WIRING, ETC.) ALL NEW AND EXISTING EQUIPMENT AND SYSTEMS SHALL BE FULLY OPERATIONAL UNDER THIS CONTRACT BEFORE THE PROJECT IS CONSIDERED COMPLETE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS THAT ARE MADE, ANY OMISSIONS OR ERRORS MADE AS A RESULT OF FAILURE TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND THE CONTRACT DOCUMENTS OF ALL TRADES.

4. CODES, REGULATIONS AND STANDARDS

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING APPROVED CODES:
  1. STATE DEMOLITION CODE
  2. STATE BUILDING CODE
  3. STATE FIRE SAFETY CODE
  4. LOCAL BUILDING CODE
  5. IBC - INTERNATIONAL BUILDING CODE
  6. NFPA - NATIONAL FIRE PROTECTION CODE
  7. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
  8. ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS
  9. OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
  10. U.L. - UNDERWRITERS LABORATORIES
  11. NFPA 101 - LIFE SAFETY CODE
  12. NFPA 99 - HEALTH FACILITIES CODE
  13. NFPA 70 - NATIONAL ELECTRICAL CODE
  14. NFPA 72 - NATIONAL FIRE ALARM CODE
  15. EPA - ENVIRONMENTAL PROTECTION AGENCY
  16. IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
  17. NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
  18. IECC - INTERNATIONAL ENERGY CONSERVATION CODE
  19. ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

5. PERMITS, FEES AND INSPECTIONS

- THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS, PAY FOR ALL GOVERNMENT, STATE SALES TAXES AND APPLICABLE FEES. THE CONTRACTOR SHALL FILE ALL DRAWINGS, COMPLETE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS FROM THE PROPER AUTHORITY OR AGENCY HAVING JURISDICTION. OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION COVERING WORK. THE CONTRACTOR SHALL SEE THAT ALL REQUIRED INSPECTIONS AND TESTS ARE MADE AND SHALL COOPERATE TO MAKE THESE TESTS AS THOROUGH AND AS READILY MADE AS POSSIBLE.

6. MATERIALS AND WORKMANSHIP

- ALL MATERIALS AND APPARATUS REQUIRED FOR THE WORK, EXCEPT AS OTHERWISE SPECIFIED, SHALL BE NEW AND OF FIRST-CLASS QUALITY. IT SHALL BE FURNISHED, DELIVERED, ERECTED, CONNECTED, FINISHED IN EVERY DETAIL AND SO SELECTED AND ARRANGED AS TO FIT PROPERLY INTO THE BUILDING SPACES. WHERE NO SPECIFIC KIND OR QUALITY MATERIAL IS GIVEN, A FIRST-CLASS STANDARD ARTICLE AS ACCEPTED BY THE ENGINEER SHALL BE FURNISHED.
- ALL EQUIPMENT AND MATERIALS SHALL BE SPECIFICATION GRADE AND BEAR THE UNDERWRITER'S LABEL. NO SUBSTITUTE OR ALTERNATE EQUIPMENT, MATERIAL, ETC. WILL BE CONSIDERED FOR THIS PROJECT.
- ALL WORK SHALL BE OF A QUALITY CONSISTENT WITH GOOD TRADE PRACTICE AND SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. THE ENGINEER/OWNER RESERVES THE RIGHT TO REJECT ANY WORK WHICH, IN HIS OPINION, HAS BEEN INSTALLED IN A SUBSTANDARD, DANGEROUS OR IN A UNSERVICEABLE MANNER. THE CONTRACTOR SHALL REPLACE REJECTED WORK IN A SATISFACTORY MANNER AT NO EXTRA COST TO THE OWNER.

7. GUARANTEES

- ALL WORKMANSHIP AND MATERIALS SHALL BE FULLY GUARANTEED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE ENTIRE INSTALLATION COVERED BY THIS CONTRACT. SHOULD ANY DEFECTS OCCUR DURING THE GUARANTEED PERIOD, THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ALL DEFECTIVE EQUIPMENT, MATERIAL AND/OR WORK AT NO EXTRA CHARGE TO THE OWNER.

8. RECORD DRAWINGS

- MAINTAIN, AT THE JOB SITE, A SET OF ELECTRICAL DRAWINGS INDICATING ALL CHANGES IN LOCATION OF THE EQUIPMENT, PANELS, DEVICES, ETC. FROM THE ORIGINAL LAYOUT. CLEARLY MARK IN RED ALL CHANGES ON THE DRAWINGS. AT THE COMPLETION OF THE PROJECT THE CONTRACTOR SHALL TURN OVER THE RECORD DRAWINGS TO THE ENGINEER/OWNER.

9. COORDINATION

- ALL WORK SHALL BE CARRIED OUT IN CONJUNCTION WITH OTHER TRADES AND FULL COOPERATION SHALL BE GIVEN IN ORDER THAT ALL WORK MAY PROCEED WITH A MINIMUM OF DELAY AND INTERFERENCE.

10. SHOP DRAWINGS

- SUBMIT ELECTRONIC COPIES FOR REVIEW, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIAL SPECIFIED. THE CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION TO THE ENGINEER FOR REVIEW. NO MATERIAL OR EQUIPMENT MAY BE DELIVERED TO THE JOB SITE OR INSTALLED UNTIL CONTRACTOR HAS IN THEIR POSSESSION, APPROVED SHOP DRAWINGS FOR THE PARTICULAR MATERIAL OR EQUIPMENT. SHOP DRAWINGS SHALL BE SPECIFIC WITH ITEMS SUBMITTED FOR APPROVAL CLEARLY IDENTIFIED.
- THE FOLLOWING IS A LIST OF ELECTRICAL ITEMS THAT MUST BE SUBMITTED FOR REVIEW:
  1. CONDUIT, WIRE AND CABLE
  2. DEVICES (RECEPTACLES, TOGGLE SWITCHES, DISCONNECT SWITCHES, PLUGMOLD, ETC.)

11. EQUIPMENT PROTECTION

- PROPERLY AND COMPLETELY PROTECT AGAINST ALL DAMAGE, ALL APPARATUS, EQUIPMENT, ETC., INCLUDED IN THIS CONTRACT. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO FURNISHED APPARATUS, EQUIPMENT, ETC., UNTIL FINAL ACCEPTANCE.

12. PROPERTY PROTECTION

- THE CONTRACTOR SHALL TAKE WHATEVER MEANS NECESSARY AND/OR REQUIRED TO PROTECT OWNER'S PROPERTY WITHIN THE WORKING AREAS FROM DUST, DEBRIS AND OTHER MATTER GENERATED BY THE WORK. NO WORK SHALL COMMENCE IN AREAS WHERE PROTECTION IS REQUIRED UNTIL APPROVAL HAS BEEN GIVEN TO THE CONTRACTOR BY THE OWNER.

13. MANUFACTURER'S INSTRUCTION

- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS OR REQUIREMENTS FOR PROPER OPERATION AND MAINTENANCE.

14. EQUIPMENT PAINTING AND CLEANING

- THOROUGHLY CLEAN ALL ELECTRICAL EQUIPMENT DEVICES AND ENCLOSURES UPON COMPLETION OF ALL WORK. REPAINT ANY EQUIPMENT WHOSE FINISH IS DAMAGED OR RUSTED. MATCH MANUFACTURER'S ORIGINAL FINISH.

15. PENETRATION SEALANT

- ALL PENETRATIONS SHALL BE SEALED WITH 3M INTUMESCENT FIRE BARRIER PENETRATION SEALANT, APPLIED PER MANUFACTURER'S AND U.L. GUIDELINES.

16. CUTTING, PATCHING, REPAIRING AND PAINTING

- THE GENERAL CONTRACTOR SHALL PERFORM ALL CUTTING, PATCHING, REPAIRING AND PAINTING FOR ALL ELECTRICAL ITEMS AND EQUIPMENT CALLED FOR UNDER THIS CONTRACT.

17. FIRE STOPS AND SEALS

- PENETRATIONS THROUGH FIRE-RATED WALLS, CEILING OR FLOORS IN WHICH CABLES OR CONDUITS PASS SHALL BE FILLED SOLIDLY BY U.L. APPROVED FIRE-STOP MATERIALS, CLASSIFIED FOR AN HOUR RATING EQUAL TO THE FIRE RATING OF THE WALL, CEILING OR FLOOR. PROVIDE TO 3M BRAND FIRE BARRIER CP25WB CAULK OR APPROVED EQUIVALENT.
- SEALING BUSHINGS SHALL BE USED ON CONDUIT AND CABLE ENDS TO EFFECTIVELY PREVENT THE INTRUSION OF WATER, A DAMP OR CORROSIVE ATMOSPHERE, DRAFT OR DUST.

PART 2 – PRODUCTS
PRODUCTS

1. DESCRIPTION

- ALL MATERIALS AND EQUIPMENT PROVIDED UNDER THIS SECTION SHALL BE NEW, FIRST GRADE, BEST OF THEIR RESPECTIVE KINDS AND IN NO WAY SHALL THEY BE LESS THAN THE QUALITY AND INTENT SET FOURTH UNDER THIS SECTION. THEY SHALL MEET THE REQUIREMENTS OF ALL STANDARDS SET UP TO GOVERN THE MANUFACTURER OF ELECTRICAL MATERIALS AND COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.

2. WIRE

- CONDUCTORS SHALL BE U.L. LISTED, 600 VOLTS, 90 DEG. C., SINGLE CONDUCTOR TYPE THWN/THHN. 98% CONDUCTIVITY, ANNEALED UNCOATED COPPER WITH PVC INSULATION COVERED WITH NYLON SHEATH JACKET. TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF UNDERWRITERS LABORATORIES STANDARD 83. WIRE SHALL BE IDENTIFIED BY SURFACE MARKING INDICATING MANUFACTURER'S IDENTIFICATION CONDUCTOR SIZE AND METAL, VOLTAGE RATING, U.L. SYMBOL AND TYPE DESIGNATION. CONDUCTORS SHALL BE STRANDED. MINIMUM SIZE SHALL BE #12 AWG UNLESS OTHERWISE INDICATED. MANUFACTURED BY ROME CABLE, TRIANGLE WIRE & CABLE, GENERAL CABLE OR ESSEX WIRE & CABLE. NONMETALLIC SHEATHED CABLE IS NOT ACCEPTABLE, UNLESS ALLOWED BY CODE.

3. METAL CLAD CABLE (MC)

- METAL CLAD CABLE SHALL BE INTERLOCKING GALVANIZED STEEL ARMOR CONSTRUCTION. COLOR CODED THERMOPLASTIC/NYLON INSULATION THHN, 90 DEGREE C., 600 VOLTS, COPPER CONDUCTORS AND INTERNAL INSULATED EQUIPMENT COPPER GROUND CONDUCTOR. MARKER TAPE AND CABLE TAPE OVER MINIMUM SIZE # 12 AWG UNLESS OTHERWISE INDICATED. MANUFACTURED BY AMERICAN FLEXIBLE CONDUIT, TRIANGLE WIRE AND CABLE, GENERAL CABLE OR STANDARD CABLE.

4. ELECTRIC METALLIC TUBING (EMT)

- ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED THIN WALL STEEL CONDUIT. MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLIED TUBE AND CONDUIT, REPUBLIC OR STEELDUCT. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY, STEEL-ZINC PLATED, SET SCREW TYPE.

5. RIGID GALVANIZED STEEL (RGS)

- ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED THICK WALL STEEL CONDUIT. MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLIED TUBE AND CONDUIT, REPUBLIC OR STEELDUCT. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY, GALVANIZED STEEL OR STEEL-ZINC PLATED, THREADED TYPE.

6. NON-METALLIC RIGID CONDUIT (PVC)

- NON-METALLIC RIGID CONDUIT SHALL BE POLYVINYL CHLORIDE SCHEDULE 40 OR SCHEDULE 80 THICK WALL CONDUIT. INSTALLLATION DEPENDENT ON NEC REQUIREMENTS. CONDUIT SHALL BE MANUFACTURED BY CANTEX, ALLIED TUBE AND CONDUIT, SOUTHERN PIPE, OR THOMAS AND BETTS. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY PVC GLUE ON TYPE.

7. LIQUID TIGHT FLEXIBLE METAL CONDUIT(LMFC)

- LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE FORMED FROM A ZINC COATED GALVANIZED LOW CARBON STEEL STRIP HAVING A UNIFORM WIDTH AND THICKNESS. FLEXIBLE STEEL CONDUIT SHALL BE COATED WITH A FLAME AND OIL RESISTANT PVC JACKET AND COMPLY WITH UL 360.. MANUFACTURED BY AFC CABLE SYSTEMS, SOUTHWIRE, ALLIED TUBE AND CONDUIT, OR APPROVED EQUAL.

8. LIQUID TIGHT FLEXIBLE NONMETALIC CONDUIT(LFNC)

- LIQUID TIGHT FLEXIBLE NONMETALIC CONDUIT AND FITTINGS SHALL BE LISTED AND LABELED AS DEFINED IN NFPA 70 AND COMPLY WITH UL 1660.. MARKED FOR INTENDED LOCATION AND APPLICATION.

9. FITTINGS

- CONDUIT BODIES FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE CAST ALUMINUM-ALUMINUM ENAMEL FINISH WITH SET SCREW HUBS AND ALUMINUM COVER.
- INSULATION BUSHINGS SHALL BE HIGH IMPACT THERMOPLASTIC PHENOLIC WITH 150 DEG. C. UL TEMPERATURE RATING.
- INSULATED GROUNDING BUSHINGS SHALL BE MALLEABLE IRON ZINC PLATED WITH MOLDED ON PHENOLIC INSULATION AND LAY-IN GROUNDING LUG.
- CONDUIT LOCKNUTS SHALL BE HEAVY NUT STOCK STEEL-ZINC PLATED.
- OFFSET NIPPLES SHALL BE MALLEABLE IRON ZINC PLATED WITH RIGID CONDUIT THREADING AND 3/4" OFFSET.
- CONNECTORS AND COUPLINGS FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE HEAVY STEEL-ZINC PLATED WITH PRE-SET/PRE-SHAKED SET SCREWS.
- CONDUIT STRAPS SHALL BE SNAP-TYPE, DOUBLE RIBBED STEEL-ZINC PLATED.
- METAL CLAD CABLE AND FLEXIBLE METALLIC CONDUIT CONNECTORS SHALL BE MALLEABLE IRON-ZINC PLATED, MALE HUB THREADS WITH LOCKNUT.
- CONDUIT FITTINGS SHALL BE MANUFACTURED BY O/Z GEDNEY, CROUSE-HINDS OR APPLETON.

10. SUPPORT FITTINGS

- SUPPORT CHANNEL SHALL BE ROLL-FORMED #12 GAUGE STEEL, SOLID BASE OR BOLT HOLE BASE - HOT DIP GALVANIZED FINISH. COMPLETE WITH ANGLE FITTINGS, SPRING NUTS, CONDUIT SUPPORTS, 3/8" OR 1/2" THREADED RODS (SIZE REQUIRED FOR LOAD), ETC.

11. CABLE TIES

- CABLE TIES SHALL BE FABRICATED OF ONE-PIECE HALLAR WITH NO METAL PARTS. MANUFACTURED BY BURNDY, T&B, PANDUIT OR BLACKBURN.

12. OUTLET BOXES

- SHALL BE GALVANIZED STEEL, FLUSH OR SURFACE MOUNTED AND OF PROPER TYPE AND SIZE AS REQUIRED FOR THE PARTICULAR APPLICATION. SIZE AND TYPE DICTATED BY THE NUMBER OF DEVICES (2 GANG MINIMUM WITH SINGLE GANG PLASTER RING FOR SINGLE DEVICE LOCATIONS), NUMBER OF CONDUCTORS AND WIRING METHOD UTILIZED. BOXES SHALL BE ADEQUATE SIZE FOR THE INSTALLATION OF CONDUCTORS WITHOUT EXCESSIVE BENDING OR CRIMPING OF THE CONDUCTORS AND DAMAGING OF CONDUCTOR INSULATION. MANUFACTURED BY STEEL CITY OR RACO.
- OUTLET BOXES SHALL BE SECURED FIRMLY IN PLACE TO THE BUILDING STRUCTURE AND SET TRUE AND SQUARE. PROVIDE SUITABLE MEANS TO SUPPORT OUTLET BOX TO TAKE THE WEIGHT OF THE LIGHTING FIXTURE OR DEVICE. OUTLET BOXED OR BOX EXTENSION RINGS SHALL BE SET FLUSH TO THE FINISHED WALL OR CEILING. BOXES MUST BE ATTACHED THAT THEY WILL NOT 'ROCK', 'SHIFT' OR 'MOVE IN AND OUT' WHEN DEVICES ARE USED. IN NO CASE SHALL BOXES BE INSTALLED BACK-TO-BACK IN A COMMON WALL DIVIDING TWO SPACES.
- WHERE MORE THAN ONE OUTLET IS SHOWN OR SPECIFIED TO BE THE SAME ELEVATION OR ONE ABOVE THE OTHER, ALIGN THEM EXACTLY ON CENTER LINES HORIZONTALLY OR VERTICALLY.
- MULTIPLE SWITCHES SHOWN AT ONE LOCATION SHALL BE INSTALLED GANGED TOGETHER UNDER ONE WALL PLATE. SWITCHES SHALL BE ARRANGED IN AN ORDER APPROPRIATE TO THE LOCATIONS OF LIGHTING FIXTURE BEING CONTROLLED.

14. CIRCUIT BREAKERS

- BRANCH CIRCUIT BREAKERS SHALL BE QUICK-MAKE, QUICK-BREAK, BOLT-IN THERMAL MAGNETIC TYPE WITH VISIBLE CURRENT RATING AND TRIP POSITION. NEW CIRCUIT BREAKERS TO MATCH PANEL BOARD MANUFACTURER. IN EXISTING PANELS, PROVIDE NEW CIRCUIT BREAKERS WITH AIC RATINGS EQUAL TO OR GREATER THAN THE LOWEST RATED EXISTING BREAKER IN THE PANEL.
- PROVIDE FULLY RATED CIRCUIT BREAKERS. SERIES RATED ARE NOT ACCEPTABLE.

15. JUNCTION BOXES, PULLBOXES AND WIREWAYS

- JUNCTION BOXES, PULLBOXES AND WIREWAYS SHALL BE OF PROPER TYPE AND SIZES AS REQUIRED. CODE GAUGE, GALVANIZED STEEL WITH KNOCKOUTS AND FLANGES TO RECEIVE THE COVERS. COVERS SHALL BE FLAT, OF THE SAME MATERIAL AS THE BOX AND FASTENED TO THE BOX WITH MACHINE SCREWS. MANUFACTURED BY HOFFMAN, SQUARE 'D', OR LEE PRODUCTS.

16. WIRING DEVICES

- ALL DEVICES SHALL BE COMMERCIAL SPECIFICATION GRADE, U.L. LISTED, SELF-GROUNDING, GROUND LUG, SIDE/BACK WIRED. COLOR SHALL BE SELECTED BY ARCHITECT OR OWNER UNLESS OTHERWISE INDICATED. MANUFACTURED BY LEGRAND, HUBBELL, LEVITON, OR PASS & SEYMOUR.
- RECEPTACLES THAT HAVE A POWER FEED THRU (FEED IN - FEED OUT) ARRANGEMENT SHALL BE PIGTAILED. FEED THRU FEATURE ON DUPLEX RECEPTACLES USE IS NOT ACCEPTABLE.
- WALL PLATES FOR SWITCHES AND RECEPTACLES SHALL BE SMOOTH THERMOPLASTIC OR NYLON IN FINISHED AREAS. COLOR TO MATCH DEVICES. MANUFACTURED BY LEVITON OR MULEBERRY.
- WALL PLATES FOR SWITCHES AND RECEPTACLES SHALL BE STAMPED STEEL FOR BACK OF HOUSE AND AREAS AND WHERE WIRING IS EXPOSED. MANUFACTURED BY MULBERRY.
- WALL PLATES FOR SWITCHES AND RECEPTACLES SHALL HAVE PANELBOARD AND CIRCUIT DESIGNATION
- RECEPTACLES LOCATED IN WET LOCATIONS SHALL BE INSTALLED WITH AN OUTLET ENCLOSURE CLEARLY MARKED 'SUITABLE FOR WET LOCATIONS WHILE IN USE'. THERE MUST BE A GASKET BETWEEN THE COVER AND THE BASE TO ASSURE A PROPER SEAL. THE ENCLOSURE MUST EMPLOY STAINLESS STEEL MOUNTING HARDWARE AND BE CONSTRUCTED OF IMPACT RESISTANT POLYCARBONATE. THE OUTLET ENCLOSURE SHALL BE U.L. LISTED. MANUFACTURED BY TAYMAC, CARLON, OR APPROVED EQUAL.
- ALL SPACES CONTAINING OCCUPANCY/VACANCY SENSORS SHALL BE PROVIDED WITH MOMENTARY TYPE LIGHT SWITCHES, UON.

17. ENCLOSED SWITCHES

- FURNISH AND INSTALL FUSIBLE / NON-FUSIBLE SAFETY SWITCHES AS INDICATED ON THE DRAWINGS. PROVIDE TYPE HD, HEAVY-DUTY, SINGLE THROW, 240VAC, UL 98 LISTED, HORSEPOWER RATED, WITH CLIPS, BOLTS TO ACCOMMODATE FUSES (WHERE INDICATED), LOCKABLE HANDLE WITH CAPABILITY TO ACCEPT PADLOCK, AND INTERLOCKED WITH COVER IN CLOSED POSITION.
- PROVIDE EQUIPMENT GROUNDING KIT, NEUTRAL GROUNDING KIT AND OTHER ACCESSORIES NECESSARY TO MEET INFORMATION FOUND IN DRAWINGS.
- PROVIDE NEMA 1 ENCLOSURES FOR INDOOR SWITCHES.
- PROVIDE NEMA 3R ENCLOSURES FOR OUTDOOR SWITCHES.

18. POWER AND CONTROL WIRING

- FURNISH AND INSTALL ALL POWER WIRING, CONTROL WIRING (120, 208, 240VAC), CONDUIT AND FITTINGS FOR ALL PLUMBING, HEATING AND VENTILATING AND AIR CONDITIONING EQUIPMENT AND FINAL CONNECTIONS. UPON COMPLETION OF WORK, CHECK OUT EACH ITEM. ITEMS TO BE CHECKED ARE VOLTAGE, ROTATION AND OVERLOAD PROTECTION.

PART 3 - EXECUTION
EXECUTION

1. INSTALLATION

- ALL WORK, MATERIALS AND MANNER OF INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
- ALL CONDUIT AND WIRING SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
- EXPOSED WIRING SHALL BE INSTALLED USING EMT.

2. RACEWAYS

- RACEWAYS, ENCLOSURES AND BOXES SHALL BE MECHANICALLY JOINED TO FORM A CONTINUOUS ELECTRICAL PATH.
- THE CONTRACTOR SHALL PROVIDE APPROVED TYPE PULL BOXES AS REQUIRED.
- MINIMUM SIZE CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
- FURNISH NYLON PULL STRINGS IN ALL EMPTY CONDUIT RUNS.
- FURNISH LOCKNUTS AND BUSHINGS FOR ALL CONDUIT TERMINATIONS IN ALL OUTLET BOXES, PANELS, PULL BOXES, CONDUIT STUBS, ETC.
- ALL CONDUIT SHALL BE INSTALLED IN PARALLEL AND PERPENDICULAR TO THE BUILDING LINES.
- ALL CONDUIT SHALL BE SUPPORTED USING CADMIUM PLATED CONDUIT STRAPS AND HANGERS.

3. WIRING

- PROVIDE WIRING TO ALL OUTLETS, EQUIPMENT, APPARATUS AND OTHER SPECIALTIES UNDER THIS DIVISION THAT WHICH FURNISHED OR PROVIDED UNDER OTHER DIVISIONS OR BY THE OWNER.
- ALL WIRING ON DRAWINGS IS SIZED FOR TYPE THWN/THHN COPPER CONDUCTORS.
- EXERCISE CAUTION IN PULLING CONDUCTORS INTO RACEWAYS SO AS NOT TO DAMAGE THE INSULATION. CABLE PULLING LUBRICANT SHALL BE USED TO ASSIST IN PULLING.
- CONDUCTOR WITHIN PANELBOARDS, JUNCTION BOXES, TROUGHS AND OTHER EQUIPMENT WHERE CONCENTRATIONS OF CONDUCTORS ARE ENCLOSED, SHALL BE NEATLY ARRANGED AND TIED WITH CABLE TIES.
- BRANCH CIRCUIT WIRING FOR SWITCHES, RECEPTACLES, DEVICES AND LIGHTING IN DRYWALL CONSTRUCTION AND ACCESSIBLE HUNG CEILING SPACE, MAY BE INSTALLED IN A METAL SHEATHED 'MC' TYPE CABLE WHERE APPROVED BY THE NEC AND THE AUTHORITY HAVING JURISDICTION. CABLE SHALL BE SUPPORTED FROM STRUCTURE 4" O.C. WITH APPROVED CABLE SUPPORTS. PROVIDE APPROPRIATE GROMMETS FOR HORIZONTAL RUNS IN METAL STUD PARTITIONS. CABLE SHALL NOT LAY ON CEILING STRUCTURE OR TILES. PROVIDE ANTI-SHORT BUSHINGS (RED HEAD) UNDER ARMOR JACKET AT TERMINATIONS.
- COMMON NEUTRAL FOR MULTIPLE BRANCH CIRCUITS IS NOT ACCEPTABLE. PROVIDE SEPARATE NEUTRAL FOR EACH BRANCH CIRCUIT.
- WIRING IN OUTLET BOXES, JUNCTION BOXES, CABINET PANELBOARDS OR EQUIPMENT SHALL HAVE A MINIMUM OF EIGHT (8") INCHES LENGTH LEADS FOR CONNECTING WIRING DEVICES TO MAKE UP CIRCUIT SPLICES.
- PROVIDE FLEXIBLE METAL CONDUIT FOR MOTOR, LIGHT FIXTURES, AND OTHER VIBRATING EQUIPMENT CONNECTIONS. LENGTH OF FLEXIBLE METAL CONDUIT DO NOT EXCEED THREE FEET (3').
- INSTALL COPPER GREEN INSULATED GROUNDING CONDUCTOR IN ALL CONDUITS AND RACEWAYS.

4. SPLICING

- SPLICING SHALL BE DONE WITH INSULATED OR NON-INSULATED CONNECTORS OF APPROPRIATE TYPES AND CURRENT-CARRYING CAPACITY. NON-INSULATED CONNECTORS SHALL BE WRAPPED WITH INSULATING TAPE TO THE THICKNESS OF THE INSULATION OF THE CONDUCTORS BEING SPLICED. ELECTRICAL TAPE SHALL BE 3M OR SUPER 88 SCOTCH VINYL FLAME-RETARDANT , COLD AND WEATHER RESISTANT.
- SPLICES FOR CONDUCTORS, SIZES #10 AWG OR SMALLER SHALL BE MADE WITH U.L. LISTED SPRING-TYPE CONNECTORS OR APPROPRIATE CURRENT CARRYING CAPACITY.
- SPLICES, TAPS AND TERMINALS FOR CONDUCTORS #8 AWG OR LARGER SHALL BE MADE WITH U.L. LISTED BOLTED PRESSURE CONNECTORS OF BRONZE OR COPPER CONSTRUCTION, OF APPROPRIATE CURRENT CARRYING CAPACITY. EQUAL TO O/Z GEDENY, BURNDY OR BLACKBURN.

5. CONDUCTOR IDENTIFICATION

- CONDUCTORS #8 AWG AND SMALLER SHALL HAVE A COLOR-CODED INSULATION.
- CONDUCTORS #6 AWG AND LARGER SHALL BE IDENTIFIED WITH TAPES APPLIED NEAR THE ENDS OF THE CONDUCTORS.
- FEEDERS AND BRANCH CIRCUIT CONDUCTORS SHALL BE IDENTIFIED FOR PHASE ROTATION.
- ALL FEEDERS, MAINS AND BRANCH CIRCUIT CONDUCTORS SHALL BE TAGGED AT BOTH ENDS WITH WIRE MARKERS IN ALL PANELS, MOTOR CONTROLS, GENERATORS, TRANSFER SWITCHES, JUNCTION BOXES, OUTLET BOXES AND DEVICE BOXES.

6. IDENTIFICATION

- FURNISH AND INSTALL NAMEPLATES FOR ALL ELECTRICAL EQUIPMENT, IDENTIFYING ITEMS BY NAME, FUNCTION AND/OR CONTROL.
- IDENTIFYING NAMEPLATES SHALL BE LAMINATED, PLASTIC TYPE, CONSISTING OF TWO BLACK PLASTIC SHEETS WITH ONE WHITE PLASTIC SHEET BONDED TO AND BETWEEN THE TWO OUTER BLACK SHEETS AND HAVING THE LETTERS ENGRAVED IN ONE BLACK TO THE DEPTH OF THE WHITE PLASTIC. FASTEN NAMEPLATES TO EQUIPMENT WITH SUITABLE ADHESIVES OR STAINLESS STEEL SCREWS. IN ADDITION TO THE PANELBOARD IDENTIFYING NAMEPLATE.
- ALL PANELS SHALL HAVE TYPEWRITTEN CIRCUIT DIRECTORIES IDENTIFYING ALL BRANCH CIRCUITS. PROVIDE ADDITIONAL COPY OF COMPLETE UPDATED PANEL DIRECTORY TO FACILITY ENGINEERING.
- USE PLASTIC-COATED WIRE MARKERS OF THE SELF-ADHESIVE. WRAPAROUND TYPE WITH PERMANENT FACTORY-PRINTED NUMBER, LETTERS AND SYMBOLS.
- WIRE MARKERS SHALL BE SECURELY ATTACHED AT BOTH ENDS, IDENTIFYING PANEL AND CIRCUIT BREAKER NUMBERS.
- ALL CONDUCTORS SHALL BE PERMANENTLY TAGGED AT TIME OF INSTALLATION. LABELS SHALL BE EQUAL TO T&B, PANDUIT OR IDEAL.

7. GROUNDING

- ALL ELECTRICAL WORK SHALL BE GROUNDED AND BONDED IN FULL CONFORMANCE WITH THE LATEST APPROVED EDITION OF THE NATIONAL ELECTRICAL CODE AND LOCAL REQUIREMENTS.
- ALL ELECTRICAL EQUIPMENT, SAFETY SWITCHES, METAL ENCLOSURES, ELECTRICAL DEVICE ENCLOSURES AND ALL OTHER EQUIPMENT SHALL BE MADE TO FORM A CONTINUOUS CONDUCTING, GROUND PATH OF LOW IMPEDANCE FOR GROUND FAULT CIRCUITS AND OPERATION OF THE CIRCUIT PROTECTIVE DEVICES WITHIN EACH CIRCUIT.
- PROVIDE GROUNDING CONDUCTOR IN ALL RACEWAYS.
- GROUND CONNECTIONS WITH THE GROUNDING CONDUCTORS SHALL BE MADE AT EACH OUTLET BOX, LIGHTING FIXTURE, MOTOR AND OTHER EQUIPMENT COMPONENTS BY MEANS OF A POSITIVELY SECURED GROUNDING CLAMP, SCREW OR CLIP. CONNECTIONS TO GROUNDING RODS, OTHER GROUNDING ELECTRODE CONDUCTORS SHALL BE MADE WITH CADWELL TYPE, EXOTHEMIC WELD PROCESS UNLESS OTHERWISE NOTED. CONNECTIONS TO PIPES SHALL BE MADE WITH APPROVED BRONZE OR BRASS CLAMPS.
- BONDING SHALL BE PROVIDED TO ASSURE ELECTRICAL CONTINUITY AND THE CAPACITY TO SAFELY CONDUCT ANY FAULT CURRENT LIKELY TO BE IMPOSED.
- ALL DEVICES (SWITCHES, RECEPTACLES, ETC.), SHALL BE GROUNDED TO CONDUIT SYSTEM WITH SIX (6") INCH SOLID COPPER #12 AWG INSULATED WIRE (GREEN) CONNECTED TO GROUND SCREW IN DEVICE AND FASTENED TO BACKBOX WITH 10-32x3/8" SLOTTED HEXAGON HEAD WASHER FACE GROUND WITH GREEN DYE FINISH.

END OF ELECTRICAL SPECIFICATIONS

① ELEC SPEC 1
NTS

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
jm	jm

checked by:
jb

approved by:
jb

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:

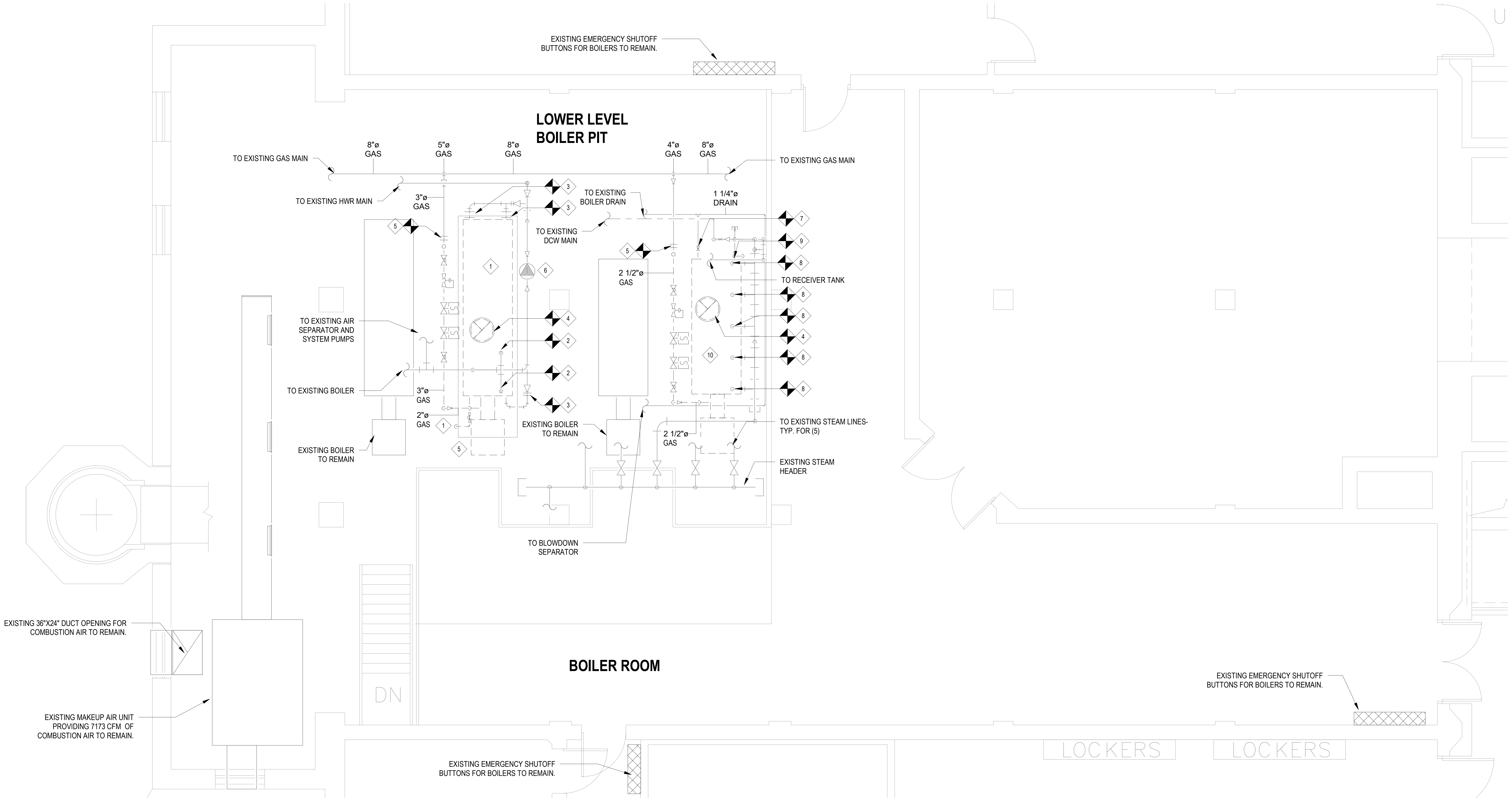
electrical specifications

date:
04.20.21

project number:
cow-5725

scale:
NTS

drawing number:
EN-002



note:
REFER TO ISOMETRIC VIEWS FOR WATER PIPE SIZES.

1 level 1 - hvac piping demo
1/4" = 1'-0"

mechanical demolition keyed notes

1 REMOVE EXISTING WATER BOILER (B-3) AND ASSOCIATED DRAIN PIPING, AS INDICATED. CONCRETE PAD TO REMAIN.

2 DISCONNECT HW SUPPLY PIPE FROM BOILER AND REMOVE PIPE BACK TO EXISTING VALVE, AS INDICATED.

3 DISCONNECT HW RETURN PIPE FROM BOILER AND REMOVE PIPE BACK TO EXISTING FLANGE, AS INDICATED.

4 DISCONNECT EXISTING BOILER VENT, AS INDICATED.

5 REMOVE EXISTING GAS BURNER. REMOVE ALL GAS TRAIN PIPES AND CONNECTED COMPONENTS FROM BURNER CONNECTION TO EXISTING FLANGE, AS INDICATED.

6 EXISTING BOILER PUMP TO REMAIN.

7 REMOVE EXISTING 1 1/4" DRAIN PIPE BACK TO EXISTING VALVE, AS INDICATED.

8 DISCONNECT SUPPLY STEAM PIPE FROM BOILER AND REMOVE BACK TO FLANGE, AS INDICATED.

9 DISCONNECT RETURN STEAM PIPE FROM BOILER AND REMOVE BACK TO VALVE, AS INDICATED.

10 REMOVE EXISTING STEAM BOILER (B-1), AS INDICATED. CONCRETE PAD TO REMAIN.

electrical demolition notes

A. DE-ENERGIZE AND DISCONNECT BRANCH CIRCUIT WIRING FOR BOILER AND MAKE SAFE. ASSOCIATED DEVICES, AND HARDWARE SERVING THE BOILER IS TO REMAIN. WIRING MAY NEED TO BE TEMPORARILY PULLED BACK TO ALLOW FOR DEMOLITION OF EXISTING BOILER AND INSTALLATION OF NEW BOILER. COORDINATE WITH MECHANICAL CONTRACTOR.

B. DEMOLITION WORK SHALL BE DONE BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WORK CONCERNING EXISTING EQUIPMENT AND SERVICES REMAINING IN THE BUILDING.

C. THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL COMPONENTS AND ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMISSION OF THEIR BID TO BECOME FAMILIAR WITH THE ACTUAL WORKING CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT DESIGNATED TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNERS REPRESENTATIVE AND ARCHITECT OF ANY UNANTICIPATED OR HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

N

issue / rev.	date:	issued for:	by:

first floor mechanical piping demolition plan

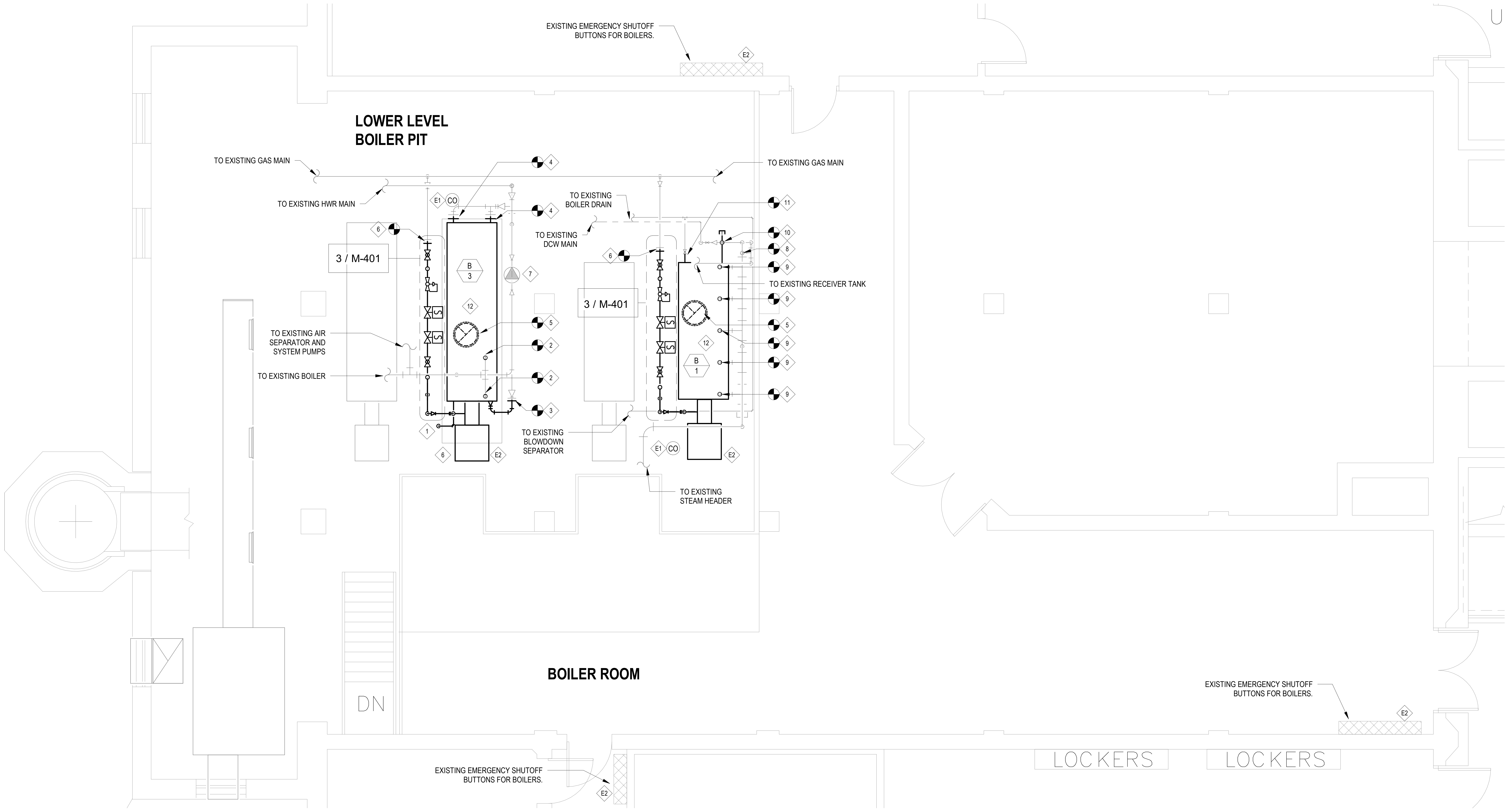
date:
04.20.21

project number:
cow-5725

scale:
As indicated

drawing number:

MD-101



note:
REFER TO ISOMETRIC VIEWS FOR WATER PIPE SIZES.

1 level 1 - hvac piping
1/4" = 1'-0"

mechanical general notes

1. LOW VOLTAGE CONTROL WIRING TO BE BY MECHANICAL CONTRACTOR. ALL LOW VOLTAGE WIRING TO BE RUN IN CONDUIT. LINE VOLTAGE WIRING BY ELECTRICAL CONTRACTOR. COORDINATE WITH ELECTRICAL.
2. RECONNECT NEW BOILER TO EXISTING BMS AND MATCH THE CURRENT BOILER CONFIGURATION. CONTRACTOR TO VERIFY EXISTING PIPING SIZES. WHERE PIPE SIZES IN FIELD DIFFER FROM SIZES NOTED ON DRAWINGS MATCH EXISTING SIZE.
3. MECHANICAL CONTRACTOR TO PROVIDE/INSTALL 2-WAY GAS SHUT OFF VALVE ALONG WITH CO SENSOR AND CONTROL PANEL. COORDINATE WITH ELECTRICAL CONTRACTOR FOR INSTALLATION OF CO SENSOR, PANEL AND WIRING TO VALVES.
4. SITE VERIFY GAS DESIGN PRESSURE AND PRESSURE DROP.
5. PROVIDE AND INSTALL REGULATOR VENT PIPING FROM THE REGULATOR TO THE NEAREST ACCEPTABLE TERMINATION LOCATION OR PROVIDE A MASSACHUSETTS APPROVED VENT LIMITER DEVICE IN ACCORDANCE WITH NFPA 54 5.8.6.1.
6. INSTALL REGULATOR VENT PIPING IN A MANNER WHICH PREVENTS WATER ENTRY, INSECT, AND DEBRIS ENTRY.
7. PROVIDE, INSTALL AND DOCUMENT METAL TAGS TO AFFIX TO THE REGULATORS.
8. INSTALL REGULATORS IN A MANNER WHICH ALLOWS THEM TO BE READILY ACCESSIBLE.
9. INSTALLATION OF NEW PIPING SHALL COMPLY TO ALL APPLICABLE CODES INCLUDING 248 CMR.
10. ALL GAS PIPING SHALL BE LABELED IN THE FOLLOWING MANNER.
    A. AT A MINIMUM OF EVERY 10 FEET.
    B. AT ALL CHANGES OF DIRECTION.
    C. EVERY GAS SHUTOFF VALVE
    D. THE LABELS SHALL BE YELLOW WITH BLACK LETTERING THAT:
        a. INDICATES THE TYPE OF GAS AND PRESSURE CONTAINED WITHIN THE PIPING SYSTEM, AND
        b. THE LETTERS SHALL BE SIZED EQUAL TO A MINIMUM OF THE PIPE DIAMETER. HOWEVER, FOR PIPING WITH A DIAMETER EXCEEDING TWO INCHES, SAID LETTERING DOES NOT NEED TO BE LARGER THAN TWO INCHES
11. INSTALLING CONTRACTOR TO CONDUCT SYSTEM PRESSURIZATION AND LEAK TESTING PER 248 CMR AND AT THE REQUEST OF THE LOCAL CODE OFFICIAL.
12. GAS PIPING SHALL BE TESTED AT A PRESSURE NOT LESS THAN TEN TIMES THE PROPOSED MAXIMUM WORKING PRESSURE OF THE GAS SYSTEM AND, THE TEST DURATION SHALL BE NOT LESS THAN ONE HOUR PER 100 LINEAR FEET OF PIPING OR FRACTION THEREOF, AND THE MAXIMUM TEST DURATION SHALL NOT EXCEED A 24 HOUR TIME PERIOD IRRESPECTIVE OF THE PIPING SYSTEM DESIGN, AND THE MAXIMUM TEST PRESSURE SHALL NOT EXCEED 100 PSIG.
13. CONTRACTOR TO COORDINATE ALL INSPECTION WITH THE LOCAL BUILDING DEPT.

mechanical keyed notes

1 PROVIDE NEW 1 1/2" DRAIN PIPE AND VALVE. ROUTE NEW DRAIN IN THE SAME LOCATION AS THE REMOVED DRAIN PIPE.

2 CONNECT NEW 4" HW SUPPLY PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.

3 CONNECT NEW 3" HW RETURN PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.

4 CONNECT NEW 4" HW RETURN PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.

5 CONNECT NEW BOILER VENT TO EXISTING, AS INDICATED.

6 PROVIDE NEW GAS BURNER AND GAS TRAIN. REFER TO M401 FOR BURNER MODEL AND GAS TRAIN PIPING DETAIL.

7 EXISTING BOILER PUMP TO REMAIN.

8 BOILER STEAM HEADER CONDITION TO BE VERIFIED BY CONTRACTOR AND REPORTED BACK TO ENGINEER. PROVIDE ALTERNATE BID FOR REPLACING STEAM HEADER IF IN POOR CONDITION. CONNECT NEW STEAM CONDENSATE PIPE FROM HEADER THROUGH TRAP TO THE CONDENSATE PIPING. REFER TO M401 DETAIL #2.

9 CONNECT NEW 4" STEAM SUPPLY PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.

10 CONNECT NEW 4" STEAM RETURN PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.

11 CONNECT NEW 1 1/4" DRAIN PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.

12 INSTALL NEW BOILER ON EXISTING CONCRETE PAD PER MANUFACTURER RECOMMENDATIONS. MAINTAIN MINIMUM RECOMMENDED SERVICE CLEARANCE AROUND UNIT.

electrical general notes

1. THE WORK SHALL INCLUDE PROVIDING ALL LABOR, MATERIAL, EQUIPMENT AND SERVICES TO CONSTRUCT AND INSTALL THE EQUIPMENT AND SYSTEMS NECESSARY TO COMPLETE THE WORK INDICATED ON DRAWINGS.

2. TEST ALL EQUIPMENT AND SYSTEMS INSTALLED TO CERTIFY COMPLIANCE WITH DRAWINGS, SPECIFICATIONS, CODES, LOCAL AUTHORITIES AND REGULATIONS, INCLUDE LABOR AND COSTS FOR TESTING, REVIEWS, APPROVALS AND CERTIFICATIONS.

3. SUPPORT ALL WORK FROM THE BUILDING STRUCTURE, INDEPENDENTLY FROM OTHER TRADES.

4. ALL WORK SHALL BE PERFORMED IN STRICT ACCORD WITH THE 2020 NATIONAL ELECTRIC CODE (NEC), THE NINTH EDITION OF THE MASSACHUSETTS BUILDING CODE WITH AMENDMENTS.

electrical keyed notes

E1. PROVIDE NEW CARBON MONOXIDE DETECTOR AND CONNECT TO BUILDINGS EXISTING FIRE ALARM SYSTEM. CARBON MONOXIDE DETECTOR SHALL BE COMPATIBLE WITH BUILDING FIRE ALARM SYSTEM. ALL EXPOSED WIRING SHALL BE IN EMT CONDUIT.

E2. CONNECT NEW BOILER TO EXISTING BRANCH CIRCUIT WIRING AND DISCONNECT AND EXISTING EMERGENCY POWER SHUTOFF DEVICE LOCATED AT ROOM ENTRANCE. CONTRACTOR SHALL VERIFY THE INTEGRITY OF THE WIRING AND DEVICES PRIOR TO RE-INSTALLATION. IF EXISTING WIRING INTEGRITY IS DEEMED UNSAFE, OR IS NOT SIZED CORRECTLY FOR NEW EQUIPMENT, NOTIFY ENGINEER OF RECORD IMMEDIATELY. COORDINATE ALL ELECTRICAL WORK WITH MECHANICAL CONTRACTOR.

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

N

issue / rev.	date:	issued for:	by:

first floor mechanical piping plan

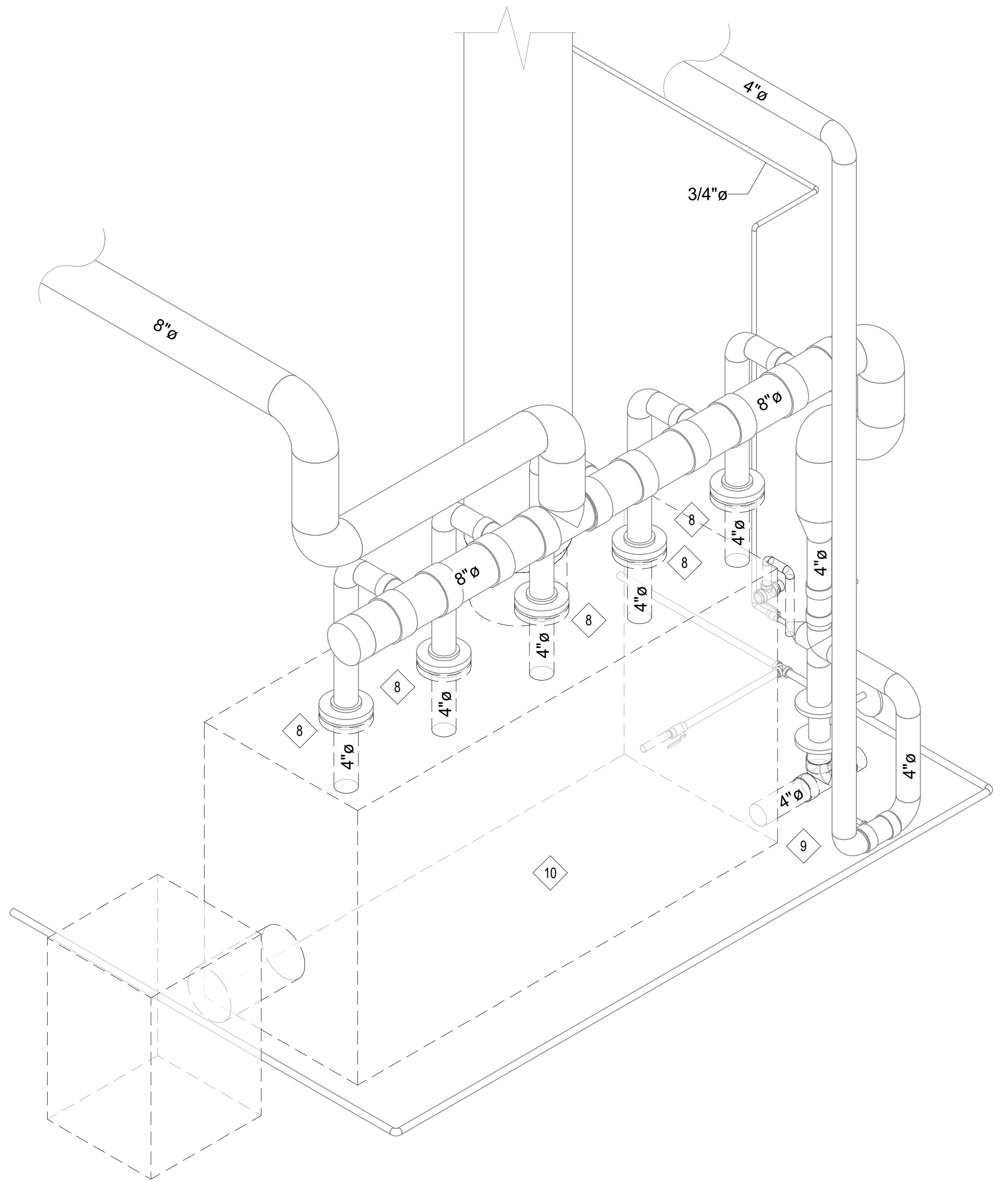
date:
04.20.21

project number:
cow-5725

scale:
As indicated

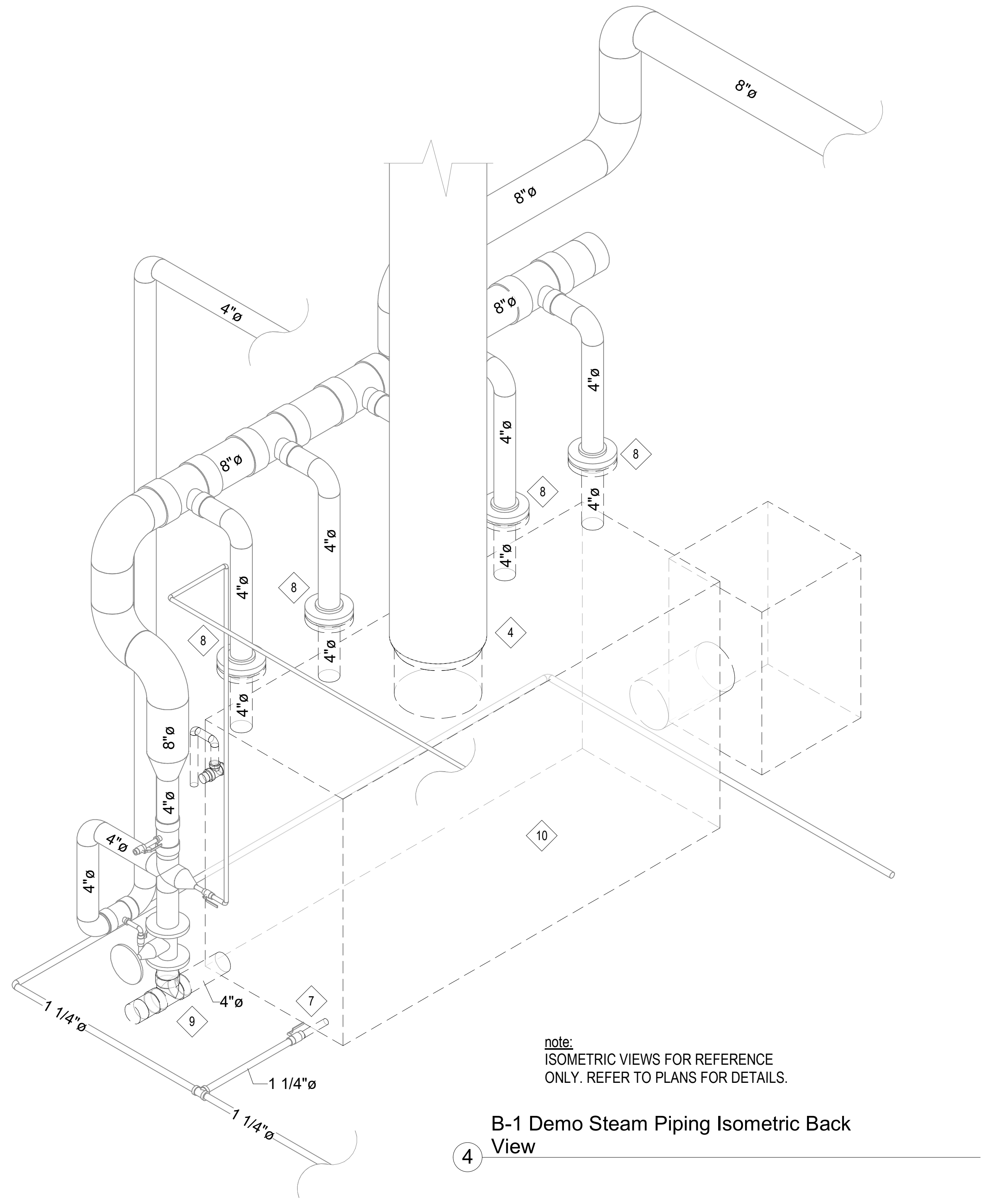
drawing number:

M-101



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

③ B-1 Demo Steam Piping Isometric Front View

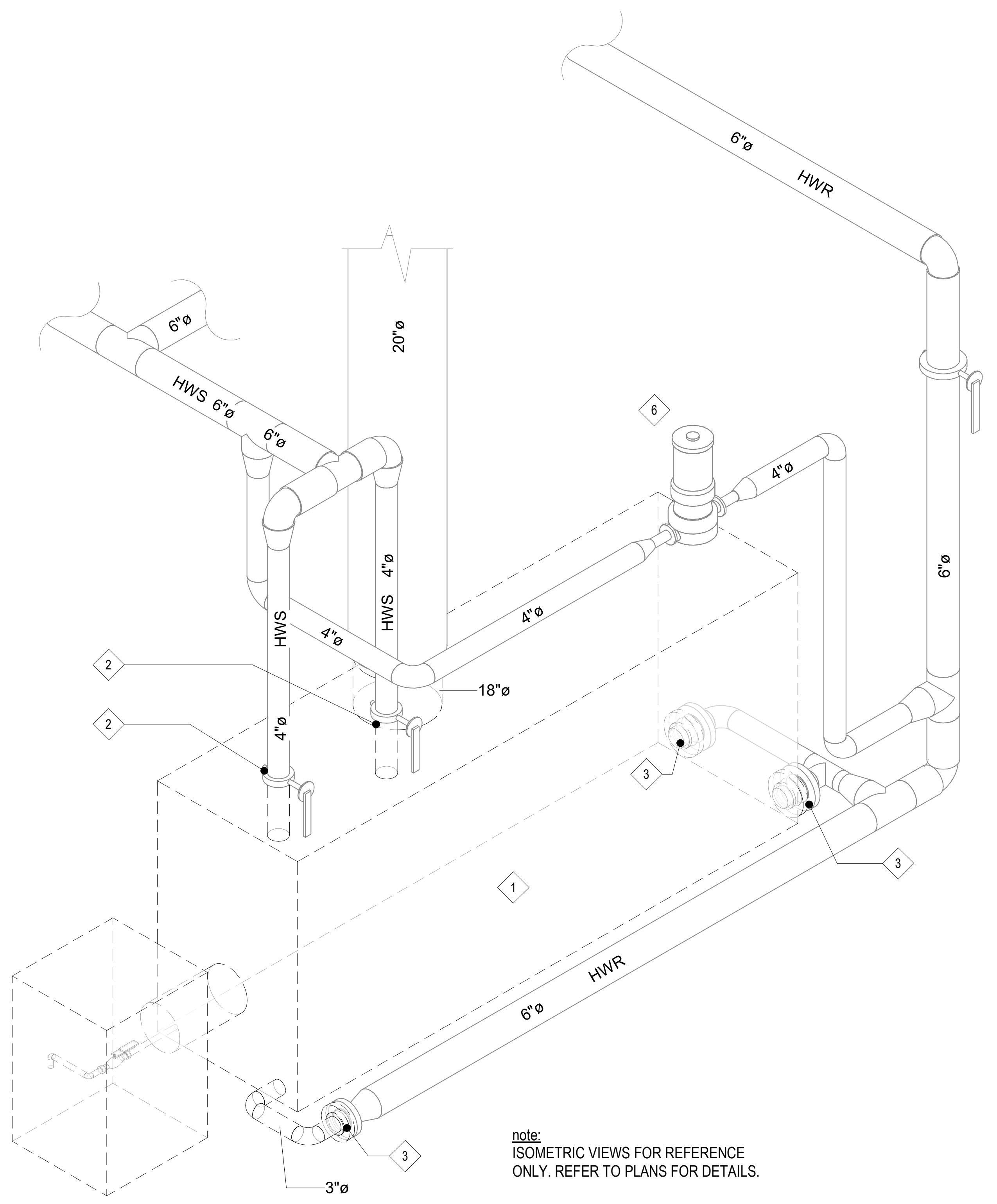


note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

④ B-1 Demo Steam Piping Isometric Back View

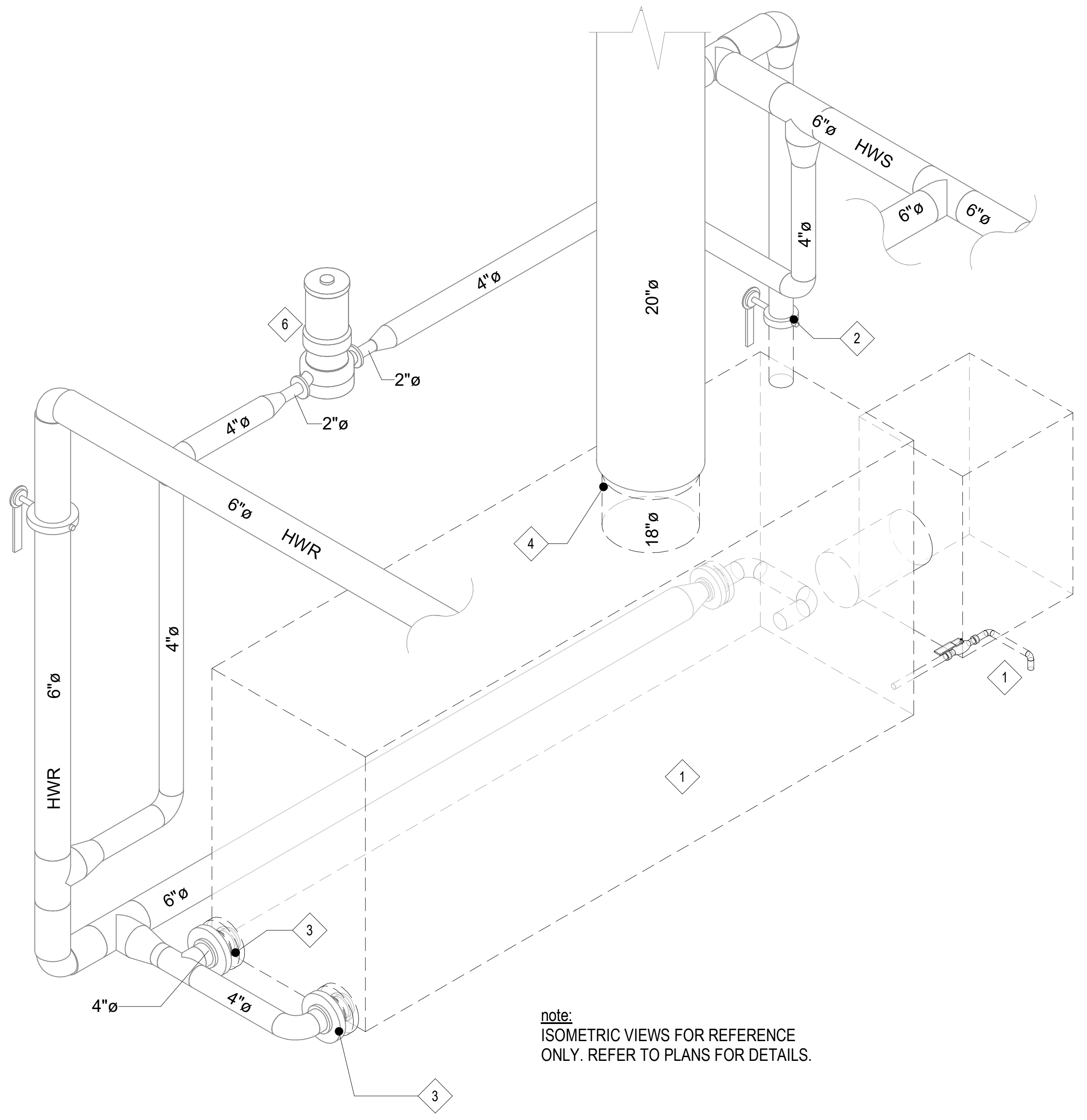
mechanical demolition keyed notes

1. REMOVE EXISTING WATER BOILER (B-3) AND ASSOCIATED DRAIN PIPING, AS INDICATED. CONCRETE PAD TO REMAIN.
2. DISCONNECT HW SUPPLY PIPE FROM BOILER AND REMOVE PIPE BACK TO EXISTING VALVE, AS INDICATED.
3. DISCONNECT HW RETURN PIPE FROM BOILER AND REMOVE PIPE BACK TO EXISTING FLANGE, AS INDICATED.
4. DISCONNECT EXISTING BOILER VENT, AS INDICATED.
5. REMOVE EXISTING GAS BURNER. REMOVE ALL GAS TRAIN PIPES AND CONNECTED COMPONENTS FROM BURNER CONNECTION TO EXISTING FLANGE, AS INDICATED.
6. EXISTING BOILER PUMP TO REMAIN.
7. REMOVE EXISTING 1 1/4" DRAIN PIPE BACK TO EXISTING VALVE, AS INDICATED.
8. DISCONNECT SUPPLY STEAM PIPE FROM BOILER AND REMOVE BACK TO FLANGE, AS INDICATED.
9. DISCONNECT RETURN STEAM PIPE FROM BOILER AND REMOVE BACK TO VALVE, AS INDICATED.
10. REMOVE EXISTING STEAM BOILER (B-1), AS INDICATED. CONCRETE PAD TO REMAIN.



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

② B-3 Demo Water Piping Isometric Front View



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

① B-3 Demo Water Piping Isometric Back View

edm

architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:
DD 100%	02.05.2021	Design Development 100%	

mechanical demo isometrics

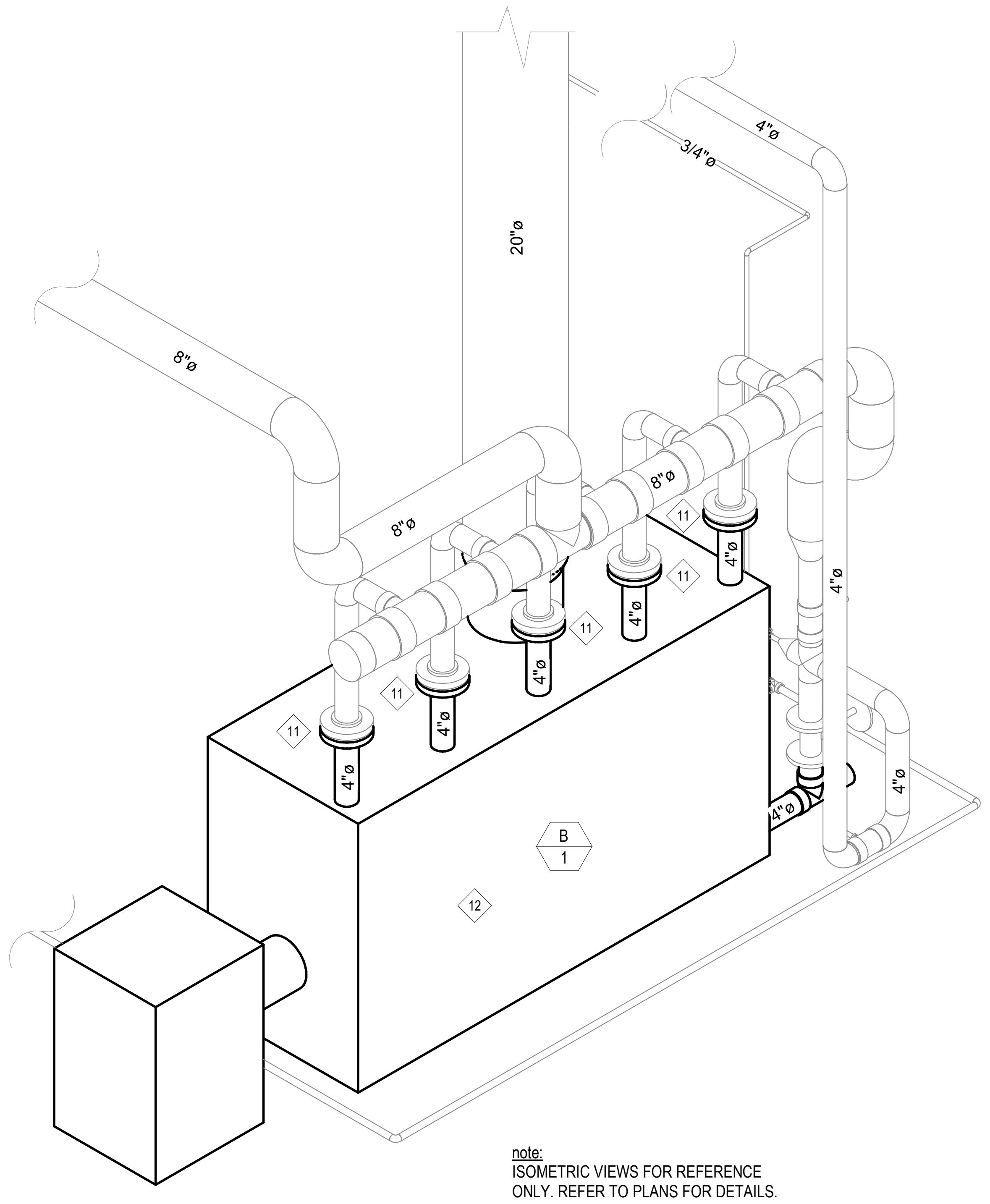
date:
04.20.21

project number:
cow-5725

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

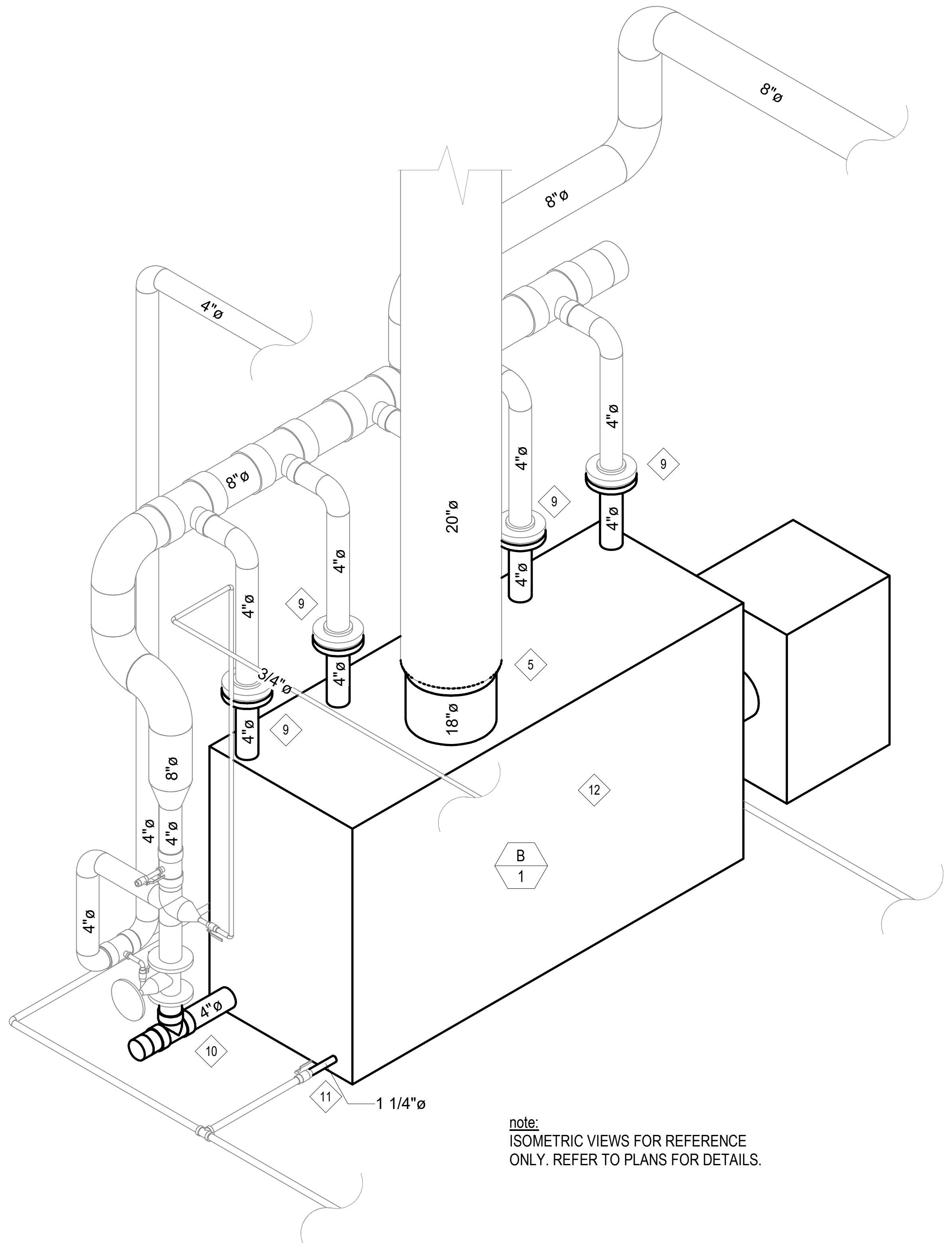
drawing number:

M-201



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

④ B-1 New Steam Piping Isometric Front View

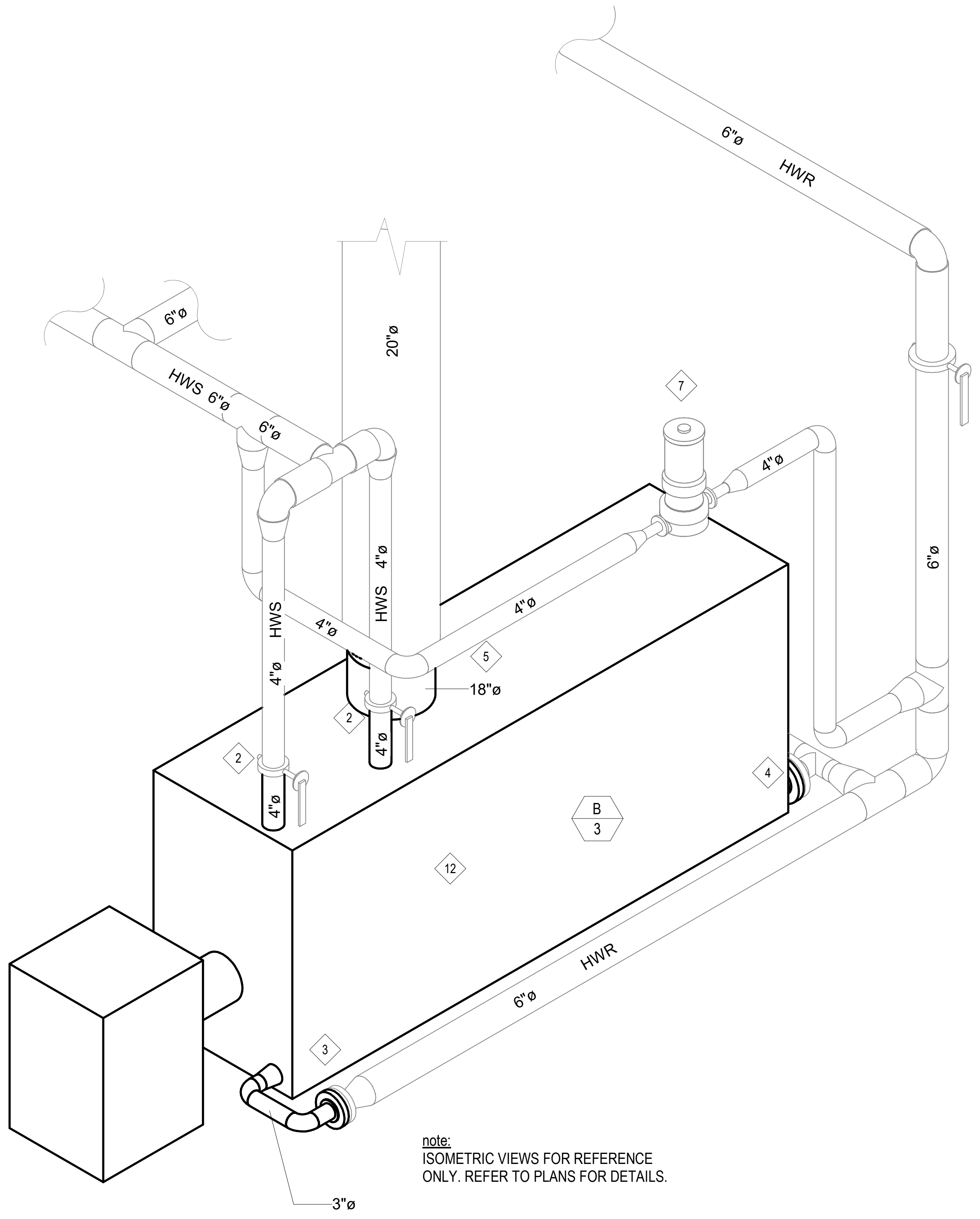


note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

③ B-1 New Steam Piping Isometric Back View

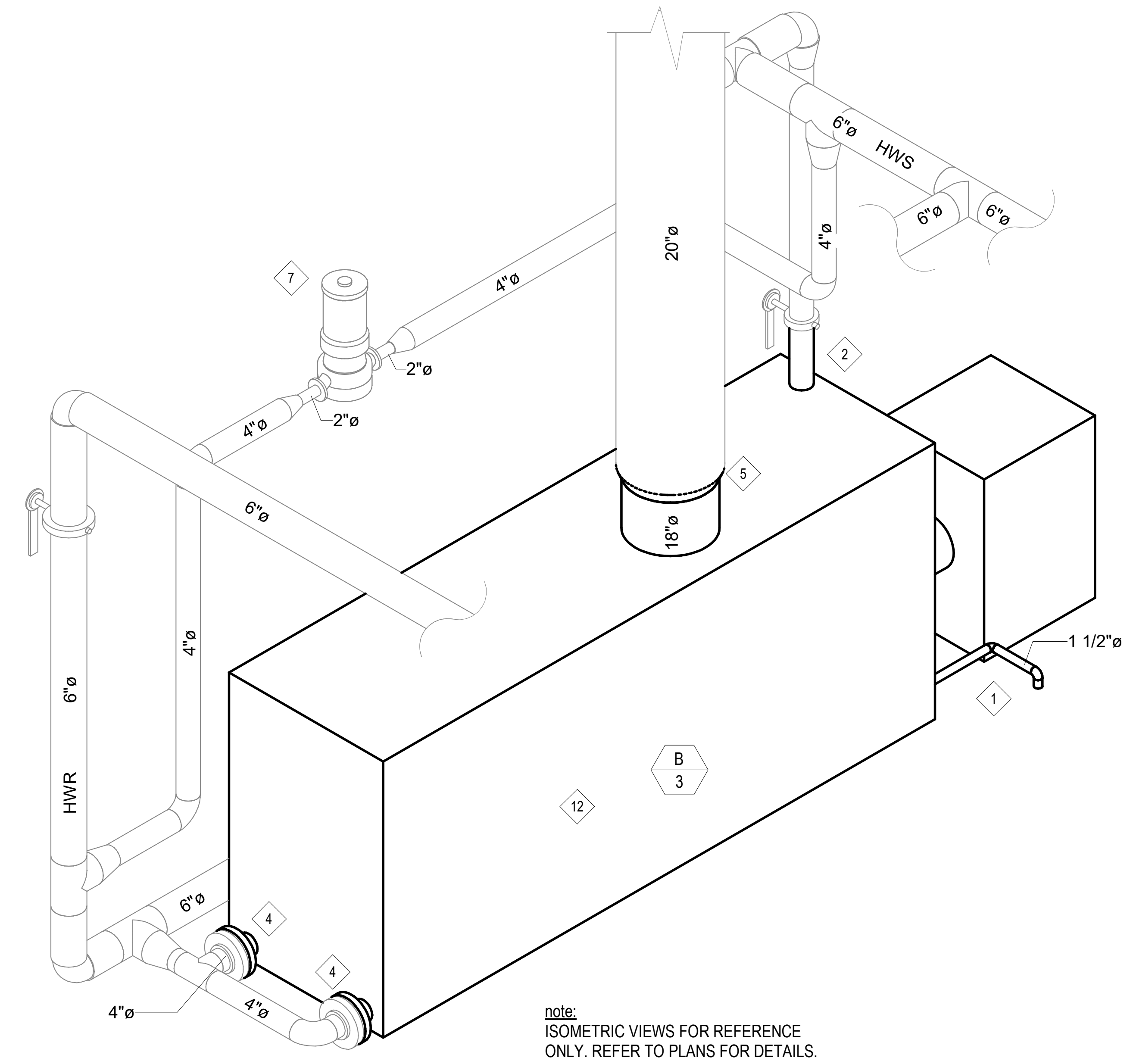
mechanical keyed notes

1. PROVIDE NEW 1 1/2" DRAIN PIPE AND VALVE. ROUTE NEW DRAIN IN THE SAME LOCATION AS THE REMOVED DRAIN PIPE.
2. CONNECT NEW 4" HW SUPPLY PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.
3. CONNECT NEW 3" HW RETURN PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.
4. CONNECT NEW 4" HW RETURN PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.
5. CONNECT NEW BOILER VENT TO EXISTING, AS INDICATED.
6. PROVIDE NEW GAS BURNER AND GAS TRAIN. REFER TO M401 FOR BURNER MODEL AND GAS TRAIN PIPING DETAIL.
7. EXISTING BOILER PUMP TO REMAIN.
8. BOILER STEAM HEADER CONDITION TO BE VERIFIED BY CONTRACTOR AND REPORTED BACK TO ENGINEER. PROVIDE ALTERNATE BID FOR REPLACING STEAM HEADER IF IN POOR CONDITION. CONNECT NEW STEAM CONDENSATE PIPE FROM HEADER THROUGH TRAP TO THE CONDENSATE PIPING. REFER TO M401 DETAIL #2.
9. CONNECT NEW 4" STEAM SUPPLY PIPE FROM BOILER TO EXISTING FLANGE, AS INDICATED.
10. CONNECT NEW 4" STEAM RETURN PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.
11. CONNECT NEW 1 1/4" DRAIN PIPE FROM BOILER TO EXISTING VALVE, AS INDICATED.
12. INSTALL NEW BOILER ON EXISTING CONCRETE PAD PER MANUFACTURER RECOMMENDATIONS. MAINTAIN MINIMUM RECOMMENDED SERVICE CLEARANCE AROUND UNIT.



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

① B-3 New Water Piping Isometric Front View



note:
ISOMETRIC VIEWS FOR REFERENCE
ONLY. REFER TO PLANS FOR DETAILS.

② B-3 New Water Piping Isometric Back View

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:
DD 100%	02.05.2021	Design Development 100%	

mechanical new work
isometrics

date:
04.20.21

project number:
cow-5725

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

drawing number:

M-202

hydronic boiler schedule

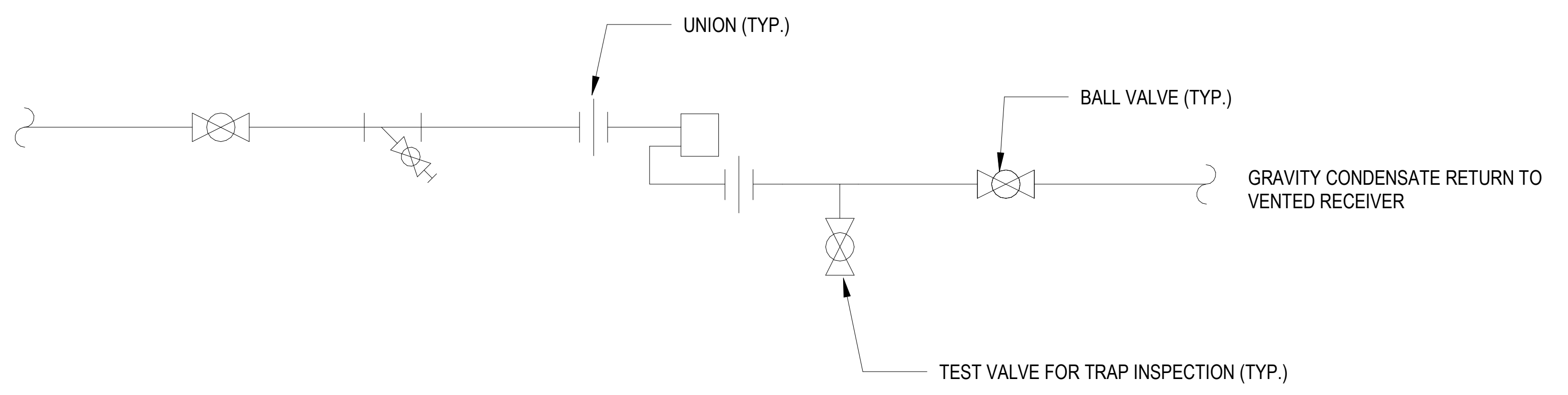
designation	location	service	type	fuel	gas input (MBH)	gas output (MBH)	Gas Pressure Range	net I=B=R rating (MBH)	fluid	GPM	pressure relief valve	BURNER		ELECTRICAL				weight	BASIS OF DESIGN		remarks
												manufacturer	model	HP	V	phase	HZ		manufacturer	model	
B-3	LOWER LEVEL BOILER PIT	BUILDING HEAT	CAST IRON WATER SECTIONAL BOILER	NAT. GAS	5773	4763	8-14 in. wc.	4142	WATER	125.0 GPM	80 psi	Power Flame	CR4 - G - 25	3 hp	208 V	3	60 Hz	9865.00 lb	BURNHAM	KV1123HWNP	1,2,3,4

HYDRONIC BOILER SCHEDULE REMARKS
1. PROVIDE WITH MODULATING BURNER CONTROLS.
2. VERIFY EXISTING BOILER SUPPLY WATER TEMPERATURE AND MATCH EXISTING.
3. PROVIDE PROBE TYPE LOW WATER CUT-OFF AND HIGH TEMPERATURE LIMIT CONTROL. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
4. PROVIDE MANUFACTURER RECOMMENDED RELIEF VALVE.

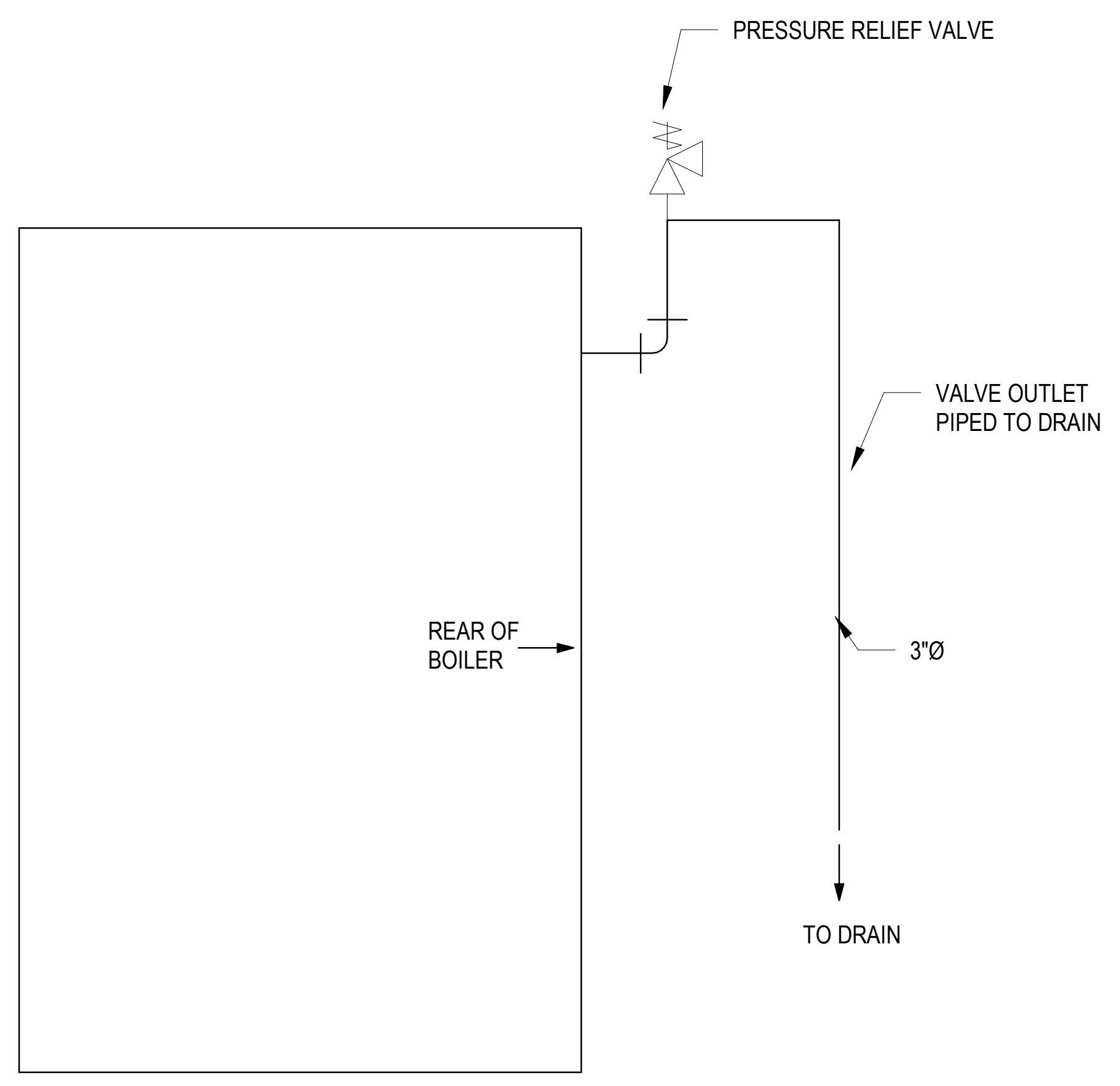
steam boiler schedule

designation	location	service	type	fuel	gas input (MBH)	Gas Pressure Range	net I=B=R rating (MBH)	fluid	pressure relief valve	BURNER		ELECTRICAL				weight	BASIS OF DESIGN		remarks
										manufacturer	model	HP	V	phase	HZ		manufacturer	model	
B-1	LOWER LEVEL BOILER PIT	BUILDING HEAT	CAST IRON STEAM SECTIONAL BOILER	NAT. GAS	3897	7-14in. wc.	3653	STEAM	15 psi	Power Flame	CR3-G-25	1.5 hp	208 V	3	60 Hz	7008.00 lb	BURNHAM	KV1116HSNP	1,2,3

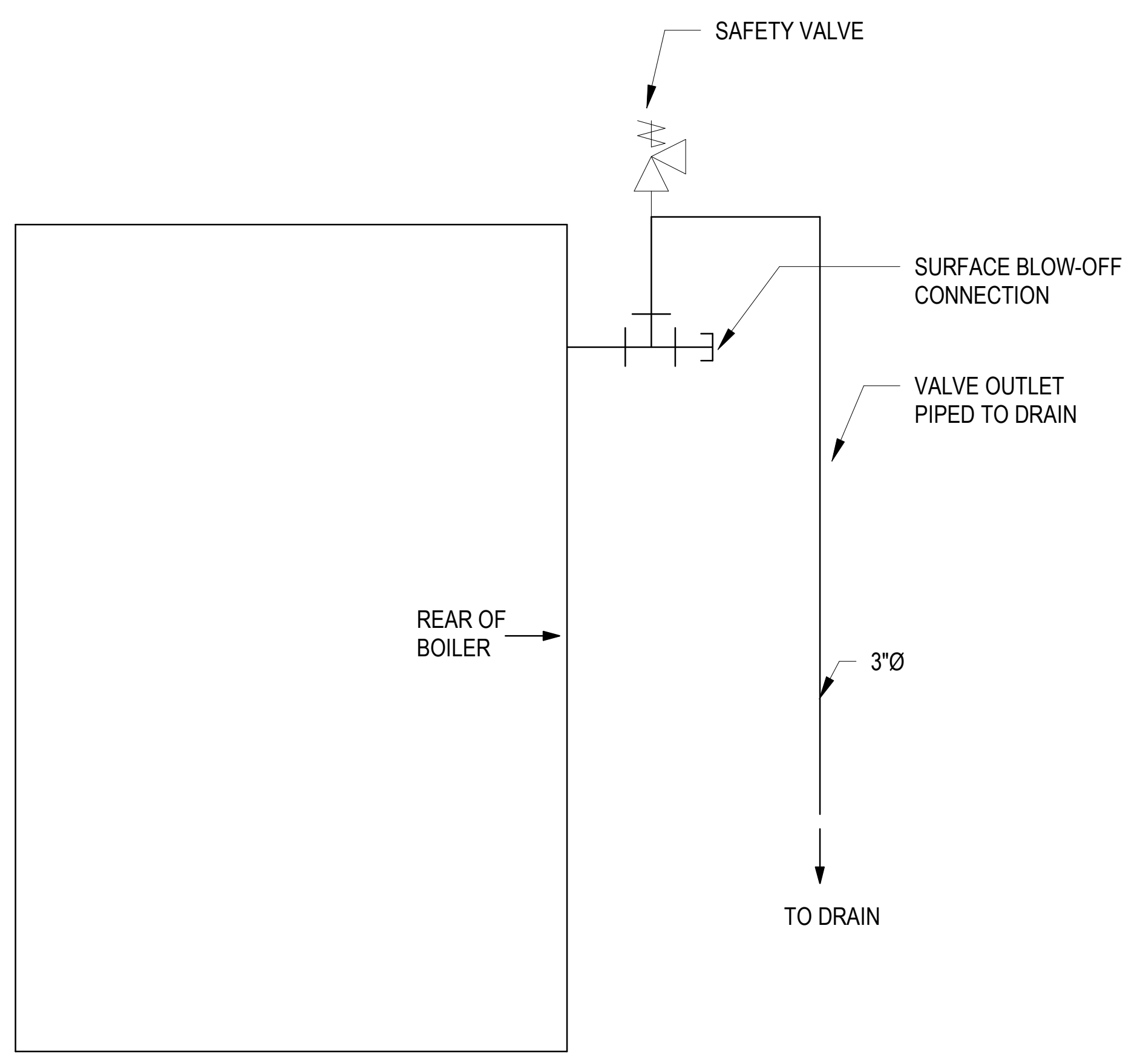
STEAM BOILER SCHEDULE REMARKS
1. PROVIDE WITH MODULATING BURNER CONTROLS.
2. PROVIDE HIGH-PRESSURE LIMIT CONTROL AND LOW WATER CUT-OFF. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
3. PROVIDE MANUFACTURER RECOMMENDED SAFETY VALVE.



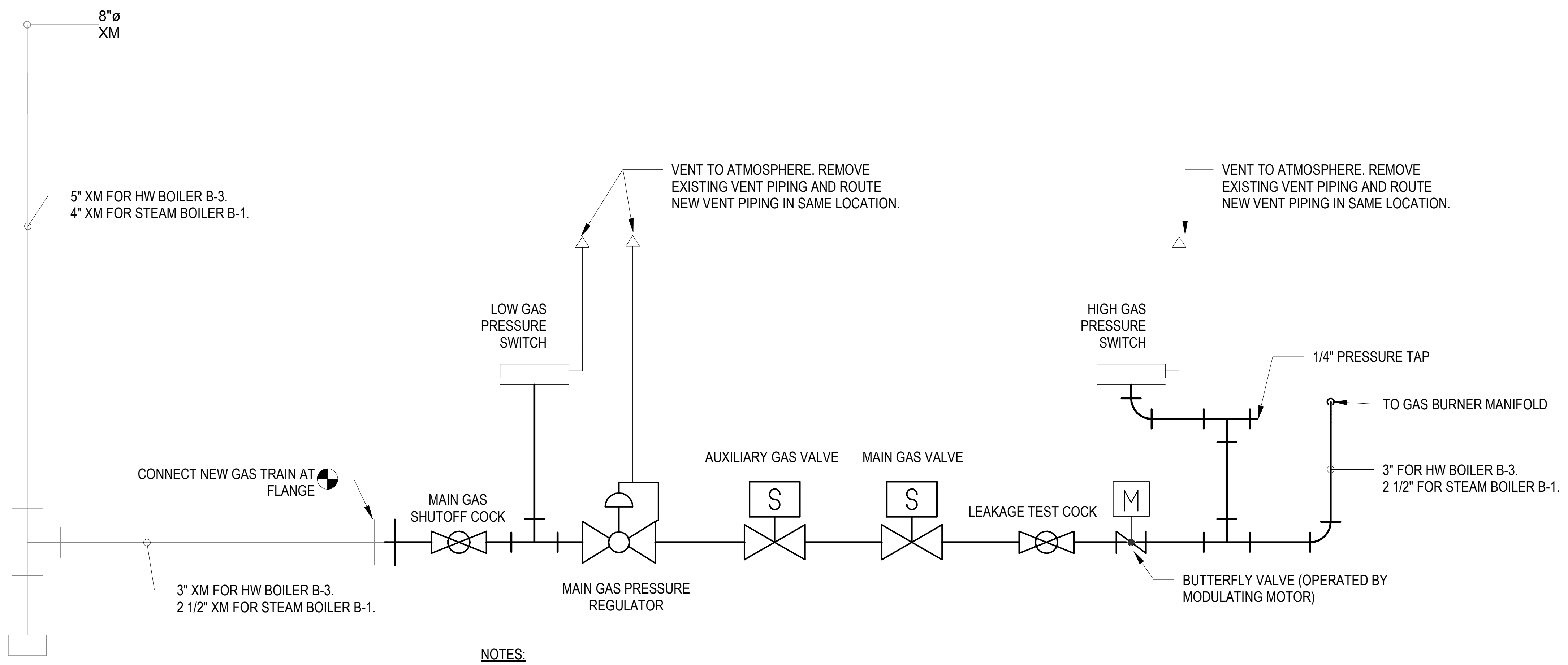
4 steam condensate trap detail
NTS



1 water boiler pressure relief valve hookup
NTS



2 steam boiler safety valve hook-up
NTS



NOTES:
1. INSTALL GAS TRAIN PER MANUFACTURER'S REQUIREMENTS.

2. CONTRACTOR TO VERIFY EXISTING PIPING SIZES. WHERE PIPE SIZES IN FIELD DIFFER FROM SIZES NOTED ON DRAWINGS MATCH EXISTING SIZE.

3. GAS VALVES TO REQUIRE MANUAL RESET IF CLOSED.

3 gas train detail
NTS

edm
architecture
•
engineering
•
management

pittsfield, ma
unionville, ct
troy, ny

(888) 336-6500
team@edm-ae.com

consultants:

design by:	drawn by:
KB	KB

checked by:
PC

approved by:
RS

GODDARD
SCHOOL BOILER
REPLACEMENT

CITY OF
WORCESTER

14 Richards St., Worcester,
MA 01603

keyplan:

issue / rev.:	date:	issued for:	by:

mechanical schedules and details

date:
04.20.21

project number:
cow-5725

scale:
As indicated

drawing number:
M-401