

MECHANICAL SPECIFICATIONS

MECHANICAL CONTRACTOR SHALL SUBMIT PRICE FOR THE COST OF SUPPLY AND INSTALLATION OF EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE AND OPERATING MECHANICAL PACKAGE. MECHANICAL PACKAGE TO CONSIST OF EQUIPMENT AND MATERIALS AS DESCRIBED IN THIS OUTLINE SPECIFICATION. REFER TO MECHANICAL PLANS FOR ACTUAL REQUIREMENTS OF EQUIPMENT.

A. GENERAL CONDITIONS

1. PROVIDE ALL LABOUR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHOWN ON ALL MECHANICAL DRAWINGS INCLUSIVE AND AS SPECIFIED HEREIN.
2. ALL NECESSARY PERMITS SHALL BE OBTAINED AND ALL FEES SHALL BE PAID TO CARRY OUT THE SPECIFIED WORK. PROVIDE ALL REQUIRED LOCAL PROVINCIAL ENGINEERING SEALS FOR DRAWINGS AND DESIGNS TO OBTAIN BUILDING CONSTRUCTION PERMITS, ETC.
3. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF COMPLETED WORK ACCEPTANCE BY THE ARCHITECT. SUBMIT DOCUMENTATION IDENTIFYING ADDITIONAL EQUIPMENT WARRANTY COVERAGE AND TIME FRAMES.
4. ALL WORK SHALL COMPLY IN EVERY RESPECT WITH ALL NATIONAL, PROVINCIAL, AND LOCAL BY-LAWS AND CODES, WHICH SHALL BE CONSIDERED PART OF THIS SPECIFICATION.
5. ALL CUTTING, PATCHING, FLASHING FOR WORK AS REQUIRED HEREIN SHALL BE BY THE GENERAL CONTRACTOR.
6. THE MECHANICAL CONTRACTOR SHALL INSTALL HEATING, AIR CONDITIONING, AND PLUMBING SYSTEMS IN COMPLETE ACCORDANCE WITH THE RECOMMENDATIONS OF THE ASHRAE, NATIONAL WARM AIR STANDARDS, SMACNA LATEST EDITION DUCT STANDARDS, AND LOCAL PLUMBING CODES.
7. CO-ORDINATE WORK WITH WORK OF OTHER TRADES TO AVOID CONFLICT.
8. ALTER THE LOCATION OF DUCTS OR PIPES AT THE DIRECTION OF THE ENGINEER WITHOUT CHARGE TO THE OWNER, PROVIDED THE CHANGE IS MADE BEFORE INSTALLATION AND DOES NOT NECESSITATE ADDITIONAL MATERIALS.
9. TENDER QUOTATIONS SHALL BE BASED ON THE USE OF SPECIFIED MANUFACTURERS. UNLESS APPROVAL FOR THE USE OF EQUAL MANUFACTURERS IS OBTAINED FROM THE ENGINEER PRIOR TO SUBMISSION OF TENDERS. ALTERNATE MANUFACTURERS MAY BE QUOTED AS AN INCREASE OR DECREASE AMOUNT TO THE TENDER PRICE, WITHOUT PRIOR APPROVAL OF THE ENGINEER. THE USE OF AN EQUAL OR ALTERNATE MANUFACTURER SHALL IN NO WAY RELIEVE THE MECHANICAL CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING ALL WORK THAT MAY BE REQUIRED BY REASON OF DIFFERENT SPACE, WEIGHT, ELECTRICAL, OR OTHER REQUIREMENTS FROM THAT OF THE SPECIFIED MANUFACTURER.
10. FURNISH TO THE ENGINEER ELECTRONIC PDF COPIES CONTAINING THEREIN ONE (1) COMPLETE SET OF MANUFACTURERS' OPERATING AND MAINTENANCE INSTRUCTIONS SHOWING ALL MAJOR EQUIPMENT, AND APPARATUS REQUIRING MAINTENANCE. INSTRUCTIONS SHALL BE COMPLETE FOR INSTALLATION, OPERATION AND MAINTENANCE AND SHALL INCLUDE PERTINENT INFORMATION SUCH AS DETAILED DRAWINGS AND OPERATION CURVES. SPARE PARTS, SUPPLIER LISTS AND ADDRESSES SHALL BE SUPPLIED. INSTRUCTIONS SHALL BE REQUIRED WITH THE OWNERS' REPRESENTATIVE TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION.
11. ALL WIRING AND SUPPLY AND INSTALLATION OF DISCONNECT SWITCHES FOR EQUIPMENT SPECIFIED HEREIN SHALL BE PERFORMED BY THE ELECTRICAL CONTRACTOR, UNLESS OTHERWISE NOTED.
12. PRIOR TO SUBMITTING TENDER PRICE, CONTRACTOR SHALL EXAMINE THE SITE AND CONDITIONS AFFECTING WORK, METHODS OF CONNECTION AND LOCATION OF ALL SERVICES INVOLVED UNDER THIS CONTRACT. FAILURE TO MAKE THIS VISIT IN NO WAY ALLEVIATES THE MECHANICAL CONTRACTOR FROM RESPONSIBILITY FOR COMPLETING THE MECHANICAL WORK OF THIS CONTRACT IN A WORKMANLIKE MANNER. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED THROUGH A FAILURE TO MAKE THIS EXAMINATION AND INVESTIGATION.
13. SCHEDULING OF ALL WORK SHALL BE ARRANGED WITH THE OWNER, AND THE OWNER SHALL BE NOTIFIED AND HIS APPROVAL OBTAINED PRIOR TO SHUTTING OFF EXISTING SERVICES FOR PURPOSES OF CONNECTING NEW WORK.
14. PROVIDE AN AUTOCAD FILE COPY OF THE CONTRACT DRAWINGS FOR RECORD 'AS-BUILT' DRAWINGS, REVISED AS REQUIRED TO SHOW ANY DEVIATIONS OF LAYOUTS FROM THAT ORIGINALLY SHOWN.
15. PROVIDE ONE SET OF SPECIAL TOOLS REQUIRED TO SERVICE EQUIPMENT AS RECOMMENDED BY MANUFACTURERS.
16. PROVIDE DIELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.

17. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE TEMPORARY HEATING AS REQUIRED FOR THE PROPER AND PROGRESS OF THE WORK.
18. THE MECHANICAL CONTRACTOR SHALL PROVIDE ELECTRONIC PDF COPIES OF SHOP DRAWINGS FOR ALL EQUIPMENT FOR REVIEW AND APPROVAL BY ENGINEERS.

19. PIPE HANGERS WHERE REQUIRED SHALL BE GRINNELL FIG. 65 FOR STEEL PIPE AND FIG. CP65 FOR COPPER PIPE, ALL WITH FIG. 140 THREADED ROD ATTACHED TO FIG. 117 EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE, OR ATTACHED TO FIG. 225 OR 227 CLAMP ATTACHED TO FLOOR JOIST AND ROOF JOIST. FOR INSULATED PIPING, PROVIDE PROTECTION SADDLES SIZE HANGER TO ACCOMMODATE INSULATION WHERE APPLIED. (NO PERFORATED STRAP HANGERS WILL BE ACCEPTED FOR SUPPORT METHOD.)

B. SHOP DRAWINGS

1. SHOP DRAWINGS AND DATA SHEETS FOR EQUIPMENT INTENDED FOR INSTALLATION UNDER THIS CONTRACT SHALL BE REVIEWED, DATED AND STAMPED BY MECHANICAL CONTRACTOR FIRST AND THEN SUBMITTED FOR CONSULTANT'S REVIEW. AFTER CONSULTANT'S REVIEW, SHOP DRAWINGS WILL BE RETURNED TO THE MECHANICAL CONTRACTOR.

C. GUARANTEE

1. THE CONTRACTOR SHALL EXECUTE AND DELIVER TO THE OWNER, BEFORE FINAL PAYMENT, A WRITTEN GUARANTEE IN FORM SATISFACTORY TO THE OWNER THAT ALL LABOUR AND MATERIALS FURNISHED AND WORK PERFORMED BY THE CONTRACTOR ARE IN ACCORDANCE WITH THE CONTRACT. CONTRACT DRAWINGS, SPECIFICATIONS AND AUTHORIZED ALTERATIONS AND ADDITIONS THERETO AND, SHOULD ANY DEFECT DEVELOP DURING THE CONTRACT GUARANTEE PERIOD, AS HEREINAFTER DEFINED DUE TO IMPROPER MATERIALS, WORKMANSHIP OR ARRANGEMENT, THE SAME TOGETHER WITH ANY OTHER WORK AFFECTED IN CORRECTING SUCH DEFECT SHALL, UPON WRITTEN NOTICE BE MADE GOOD BY THE CONTRACTOR WITHOUT EXPENSE TO THE OWNER.
2. THE CONTRACTOR'S AFORESAID GUARANTEE SHALL COVER ALL WORK UNDER THE CONTRACT, WHETHER OR NOT ANY PORTION OR TRADE HAS BEEN ASSIGNED OR SUBLET. IN THE EVENT ANY PORTION OF THE WORK IS PERFORMED BY ASSIGNEES AND SUBCONTRACTORS THEIR WRITTEN GUARANTEE TO THE OWNER COVERING THEIR RESPECTIVE PORTIONS OF THE WORK FOR THE PERIODS SPECIFIED AND SHALL DELIVER SAME, TOGETHER WITH HIS OWN GUARANTEE, TO THE OWNER. ASSIGNEES AND SUBCONTRACTORS' GUARANTEES SHALL EXPRESSLY PROVIDE THAT THE SAME SHALL BE ENFORCEABLE DIRECTLY BY THE OWNER AND SHALL RUN CONCURRENTLY WITH THE CONTRACTOR'S GUARANTEE.

D. CLOSE-OUT DOCUMENTS AND INSTRUCTIONS

- AS-BUILT DRAWINGS
- ALL TEST REPORTS
- WARRANTIES
- ALL APPROVAL AND VERIFICATION CERTIFICATES
- MAINTENANCE MANUALS
- INSTRUCT OWNER IN THE OPERATION OF ALL EQUIPMENT AND MAKE FAMILIAR WITH SYSTEM
- AIR AND WATER TESTING AND BALANCING REPORT

E. COMMISSIONING AND DEMONSTRATION

1. THE COMMISSIONING PROCESS REQUIRES THE COMPLETE PROCESS TO TEST, ADJUST AND BALANCE SYSTEMS TO PERFORM IN ACCORDANCE WITH REQUIREMENTS OF CONTRACT DOCUMENTS AND TO DO ALL OTHER WORK AS SPECIFIED IN THIS SECTION.
  2. THE MECHANICAL CONTRACTOR SHALL ACT AS THE COMMISSIONING AGENT FOR THIS PROJECT.
  3. TO ADJUST AND REGULATE EQUIPMENT AND SYSTEMS SO AS TO MEET SPECIFIED PERFORMANCE REQUIREMENTS AND TO ACHIEVE SPECIFIED INTERACTION WITH ALL OTHER RELATED SYSTEMS UNDER ALL NORMAL AND EMERGENCY LOADS AND OPERATING CONDITIONS.
  4. BALANCE SYSTEMS AND EQUIPMENT TO REGULATE FLOW RATES TO MATCH LOAD REQUIREMENTS OVER FULL OPERATING RANGES.
- F. PLUMBING
1. PROVIDE COMPLETE FUNCTIONAL PLUMBING SYSTEM COMPRISED OF DOMESTIC WATER PIPING, NATURAL GAS PIPING, VENT PIPING, SANITARY DRAINAGE PIPING, ETC.
  2. SANITARY DRAINAGE AND VENT PIPING MATERIAL SHALL BE CAST IRON CERTIFIED TO CAN/CSA-B70 OR PVC DRAIN, WASTE, AND VENT PIPE AND PIPE FITTINGS CERTIFIED TO CAN/CSA-B181.2. ABS PIPING IS NOT ACCEPTABLE.
  3. PROVIDE IPEX SYSTEM XFR PIPE AND FITTINGS C/W APPROVED FIRE STOPS TO CAN/ULC-S115 IN AREA WHERE THE CEILING SPACE IS UTILIZED AS RETURN AIR PLENUM OR WHEN INSTALLED IN A BUILDING CLASSIFIED AS A HIGH BUILDING.
  4. STORMWATER DRAINAGE PIPING MATERIAL SHALL BE CAST IRON CERTIFIED TO CSA-B70 OR PVC DRAIN, WASTE AND VENT PIPE AND PIPE FITTINGS CERTIFIED TO CAN/CSA-B181.2. ABS PIPING IS NOT ACCEPTABLE.
  5. DOMESTIC HOT AND COLD WATER PIPING SHALL BE TYPE "L" HARD COPPER TUBING WITH SOLDERED FITTINGS OR CROSS-LINKED POLYETHYLENE PIPE AND FITTINGS CERTIFIED TO CAN/SCA-B137.5.
  6. DRAINS AND VENT PIPING ABOVE GROUND INSIDE BUILDING SHALL BE DWV COPPER, CAST IRON CLASS 4000 OR PLASTIC PIPE WHERE APPLICABLE OR APPROVED BY LOCAL AUTHORITIES. JOINTS SHALL BE SOLDERED FOR COPPER, MECHANICAL JOINT FOR CAST IRON PIPE, AND SOLVENT CEMENT FOR PLASTIC PIPE.
  7. MECHANICAL CONTRACTOR SHALL VERIFY ON SITE ALL CONNECTION POINTS TO EXISTING SERVICES. EXTEND ALL SERVICES INSIDE BUILDING AS SHOWN ON DRAWINGS. CONNECT SEWER AND WATER SERVICES TO EXTERIOR BUILDING SERVICES. CONFIRM AND VERIFY EXACT LOCATIONS AND INVERTS OF BUILDING SERVICES WITH SITE CONDITIONS. ALL CONNECTIONS TO BE MADE IN ACCORDANCE WITH LOCAL PROVINCIAL CODE REQUIREMENTS.
  8. USE 95.5 TIN ANTIMONY BRAZING SOLDER ON ALL HOT AND COLD WATER PIPING. USE NON-CORROSIVE NON-LEADED FLUX.
  8. ALL VALVES TO BE BY ONE MANUFACTURER.
  9. MECHANICAL CONTRACTOR SHALL ALLOW FOR IN TENDER QUOTATION ANY ADDITIONAL LABOUR, MATERIALS, ETC. DEEMED NECESSARY DUE TO EXACT SITE CONDITIONS WHICH HAVE NOT BEEN REFLECTED ON MECHANICAL DRAWING OR IN MECHANICAL SPECIFICATION.
  10. MECHANICAL CONTRACTOR SHALL CONNECT DOMESTIC WATER LINES, VENT LINES, SANITARY DRAIN SERVICES AS SHOWN FOR ALL PLUMBING FIXTURE INSTALLATIONS.
  11. PROVIDE ACCESS DOORS, CLEANOUT COVERS, ETC FOR ALL EQUIPMENT REQUIRING ACCESS FOR SERVICING OR OPERATING PURPOSES. ACCESS DOORS TO BE PROVIDED BY DIVISION 15 FOR INSTALLATION BY SUB-TRADE PROVIDING WALL, CEILING, FLOORING, ETC.
  12. PROVIDE SHUT-OFF VALVES ON BOTH DOMESTIC WATER LINES SERVING EACH PIECE OF EQUIPMENT, PLUMBING FIXTURE, ETC.
  13. PROVIDE ESCUTCHEON PLATE COVERS OVER ANY DOMESTIC WATER LINES, DRAIN LINES, ETC PENETRATING WALLS.
  14. PROVIDE TRAP PRIMERS AS PER LOCAL CODE REQUIREMENTS.

G. PIPING AND EQUIPMENT IDENTIFICATION

1. IDENTIFY ALL PIPING SYSTEMS. INDICATE PIPE SIZE, SERVICE AND DIRECTION OF FLOW.
2. THE LETTERING SHALL BE PROPORTIONAL TO THE OUTSIDE DIAMETER OF THE PIPE OR COVERING RANGING FROM 13MM HIGH TO 20MM O.D., PIPE OR COVERING UP TO 100MM HIGH ON 300MM O.D. PIPE OR COVERING. BRADLEY PIPE TAG SHALL BE THE STANDARD OF LABELS. PIPES SMALLER THAN 20MM O.D. PIPE OR COVERING MAY BE Banded WITH COLOURED PLASTIC TAPE IN LIEU OF PAINT AND THE CONTENTS IDENTIFIED BY MEANS OF "DYMO" EMBOSSED PLASTIC LABELS. STENCIL A DIRECTION-OF-FLOW ARROW ON EACH COLOUR BAND. PIPE IDENTIFICATION SHALL BE APPLIED AT EACH HORIZONTAL OR VERTICAL CHANGE IN DIRECTION AND A MAXIMUM OF 12 METER APART.

H. PIPING INSULATION

1. ALL WATER LINES LISTED BELOW SHALL BE INSULATED WITH 25MM THICK DUAL TEMPERATURE GLASS FIBRE PIPE INSULATION. INSULATION SHALL BE MANUFACTURED BY FIBREGLOSS OF CANADA.
2. THIS INSULATION SHALL BE SUPPLIED COMPLETE WITH FLAME RETARDANT VAPOUR BARRIER JACKET CONSISTING OF GLASS FIBRE, REINFORCED LAMINATE OF ALUMINUM FOIL AND KRAFT PAPER. LONGITUDINAL SEAMS OF THE VAPOUR BARRIER JACKET SHALL BE SEALED WITH VAPOUR-PROOF ADHESIVE, FLINTKOTE TYPE 32. INSULATE AND TAPE ALL VALVES AND FITTINGS. EXPOSED PIPING INSULATION TO BE FINISHED WITH 8 OZ. FATTAL U.L.C. LISTED CANVAS AND CHILDERS LAGGING. NON-U.L.C. LISTED CANVAS WILL NOT BE ACCEPTED.
3. PROVIDE POLYVINYL JACKETING FOR ALL PIPING INSIDE MECHANICAL ROOM AND IN AREAS EXPOSED TO VIEW.
4. INSULATE THE FOLLOWING PIPING, FITTINGS AND COMPONENTS:
  - DOMESTIC COLD WATER
  - DOMESTIC HOT WATER AND RECIRCULATION
  - INTERNAL RAIN WATER LEADERS ABOVE GRADE
  - SANITARY VENTS
  - CONDENSATE DRAINS
  - HYDRONIC PIPING
5. UNBURIED DOMESTIC COLD WATER PIPING: HEAVY DENSITY GLASS FIBRE PREFORMED PIPE INSULATION WITH MAXIMUM OF 0.033 W/M.K CONDUCTIVITY AT 24°C MEAN WITH FACTORY APPLIED VINYL FOIL KRAFT LAMINATED GLASS FIBRE REINFORCED FIRE RESISTIVE VAPOUR BARRIER JACKET WITH NOT MORE THAN 1.15 PERM RATING (ASJ) WITH SEALED LAPPED JOINTS. USE 1" (25 MM) THICKNESS ON PIPING UP TO 1-1/2" (38 MM) SIZE, AND 1-1/2" (38 MM) THICKNESS ON PIPING 2" (50 MM) AND ABOVE.
6. UNBURIED DOMESTIC HOT WATER RECIRCULATING PIPING: HEAVY DENSITY GLASS FIBRE PREFORMED PIPE INSULATION WITH MAXIMUM 0.035 W/M.K CONDUCTIVITY AT 38°C MEAN WITH FACTORY APPLIED FIRE RESISTIVE VAPOUR BARRIER JACKET OF NOT MORE THAN 1.15 PERM RATING. USE 1-1/2" (38 MM) THICKNESS ON ALL DOMESTIC HOT WATER RECIRCULATING PIPING.
7. UNBURIED DOMESTIC HOT WATER PIPING: HEAVY DENSITY GLASS FIBRE PREFORMED PIPE INSULATION WITH A MAXIMUM 0.035 W/M.K CONDUCTIVITY AT A MEAN TEMPERATURE OF 38°C WITH FACTORY APPLIED FIRE RESISTIVE VAPOUR BARRIER JACKET OF NOT MORE THAN 1.15 PERM RATING. INSULATE ALL PIPES BETWEEN THE HOT WATER SOURCE OR RECIRCULATION LOOP AND THE FIXTURE USING THE FOLLOWING MINIMUM THICKNESSES: USE 1" (25 MM) THICKNESS ON PIPING UP TO 1-1/2" (38 MM) SIZE, AND 1-1/2" (38 MM) THICKNESS ON PIPING 2" (50 MM) AND ABOVE.

8. EXPOSED HORIZONTAL & VERTICAL RUNS OF SANITARY DRAINS EXCEPT AS NOTED ABOVE: 1" FIBERGLASS INSULATION WITH POLYVINYL COVERING C/W PVC JACKETS.
  9. HOT WATER HEATING PIPES AND FITTINGS: 1-1/2 (38MM) THICK GLASS FIBRE PIPE INSULATION (MAXIMUM 0.30 CONDUCTIVITY AT 93°C MEAN) WITH FIBRE RESISTIVE VAPOUR BARRIER "ALL SERVICE JACKET" (ASJ) JACKET FACTORY ATTACHED WITH APPROVED FLAME-RESISTANT SDHESIVE.
  10. VALVES AND FITTINGS: 2" (50 MM) GLASS FIBRE BLANKET CONFORMING TO CGSB #51\_BF11 COMPRESSED TO SAME THICKNESS AS ADJOINING INSULATION AND SECURED WITH JUTE TWINE. OVER THIS APPLY SMOOTH COAT OF INSULATING CEMENT AND RECOVER WITH 4 OZ (135.6 G/M<sup>2</sup>) CANVAS. ON COLD WATER PIPING WRAP BLANKET WITH FOIL FACED FRICTION TAPE OVERLAPPED TO FORM VAPOUR BARRIER BEFORE APPLYING INSULATION CEMENT. SEAL ALL VAPOUR BARRIERS.
  11. END JOINTS SHALL BE COVERED WITH A 4" (100 MM) WIDE FACTORY SUPPLIED STRIP OF THE SAME MATERIAL AS THE INSULATION JACKET AND SEALED WITH ADHESIVE.
  12. AT ALL FITTINGS AND VALVES, INSULATION ENDS SHALL BE MITRED AND FITTINGS, ETC., SHALL BE TIGHTLY WRAPPED WITH GLASS FIBRE BLANKET BUILT UP TO AN EQUIVALENT THICKNESS. ALUMINUM FOIL 2 MIL THICKNESS SHALL BE WRAPPED OVER THE BLANKET INSULATION TO PROVIDE A VAPOUR BARRIER AND THE WHOLE WRAPPED WITH GLASS FABRIC MEMBRANES SATURATED WITH BRUSH COAT OF VAPOUR PROOF MASTIC.
  13. CONDENSATE PIPING: 0.5" (13 MM) THICK GLASS FIBER PIPE INSULATION. ENSURE CONTINUOUS VAPOUR BARRIER.
- I. FIRE STOPPING
1. THIS CONTRACTOR SHALL WORK WITH ALL OTHER CONTRACTORS ON THE PROJECT IN PROVIDING ONE COMMON METHOD OF FIRE STOPPING ALL PENETRATIONS MADE IN FIRE RATED ASSEMBLIES.
  2. APPROVED FIRE STOPPING AND SMOKE SEAL MATERIAL IN ALL FIRE SEPARATIONS AND FIRE RATINGS WITHIN ANNULAR SPACE BETWEEN PIPES, DUCTS, INSULATION AND ADJACENT FIRE SEPARATION AND/OR FIRE RATING.
  3. DO NOT USE CEMENTIOUS OR RIGID SEALS AROUND PENETRATIONS FOR PIPE, DUCTWORK, OR OTHER MECHANICAL ITEMS.
  4. INSULATED PIPES AND DUCTS: ENSURE INTEGRITY OF INSULATION AND VAPOUR BARRIER AT FIRE SEPARATION.
  5. PROVIDE MATERIALS AND SYSTEMS CAPABLE OF MAINTAINING EFFECTIVE BARRIER AGAINST FLAME, SMOKE AND GASES. ENSURE CONTINUITY AND INTEGRITY OF FIRE SEPARATION.
  6. COMPLY WITH THE REQUIREMENTS ON CAN4-S115-M35, AND DO NOT EXCEED OPENING SIZED FOR WHICH THEY HAVE BEEN TESTED.
  7. SYSTEMS TO HAVE AN F OR FT RATING (AS APPLICABLE) NOT LESS THAN THE FIRE PROTECTION RATING REQUIRED FOR CLOSURES IN FIRE SEPARATION. PROVIDE "FIRE WRAP" BLANKET AROUND SERVICES PENETRATING FIRE WALLS. EXTENT OF BLANKET MUST CORRESPOND TO ULC RECOMMENDATIONS.
  8. THE FIRE STOPPING MATERIALS ARE NOT TO SHRINK, SLUMP OR SAG AND TO BE FREE OF ASBESTOS, HALOGENS AND VOLATILE SOLVENTS.
  9. FIRESTOPPING MATERIALS ARE TO CONSIST OF A COMPONENT SEALANT APPLIED WITH A CONVENTIONAL CAULKING GUN AND TROWEL.
  10. FIRE STOP MATERIALS ARE TO BE CAPABLE OF RECEIVING FINISH MATERIALS IN THOSE AREAS WHICH ARE EXPOSED AND SCHEDULED TO RECEIVE FINISHES. EXPOSED SURFACES ARE TO BE ACCEPTABLE TO CONSULTANT PRIOR TO APPLICATION OF FINISH.
  11. FIRESTOPPING SHALL BE INSPECTED AND APPROVED BY LOCAL AUTHORITY PRIOR TO CONCEALMENT OR ENCLOSURE.
  12. INSTALL MATERIALS AND COMPONENTS IN ACCORDANCE WITH ULC CERTIFICATION, MANUFACTURER'S INSTRUCTIONS AND LOCAL AUTHORITY.
  13. SUBMIT PRODUCT LITERATURE AND INSTALLATION MATERIAL ON FIRE STOPPING IN SHOP DRAWING AND PRODUCT DATA MANUAL. MAINTAIN COPIES OF THESE ON SITE FOR VIEWING BY INSTALLERS AND CONSULTANT.
  14. MANUFACTURER OF PRODUCT SHALL PROVIDE CERTIFICATION OF INSTALLATION. SUBMIT LETTER TO THE CONSULTANT.
  15. ACCEPTABLE MANUFACTURER: 3M, HILTI OR APPROVED EQUIVALENT.

K. HEATING, VENTILATION & AIR CONDITIONING

1. PROVIDE SUPPLY AIR, RETURN AIR, AND EXHAUST AIR DUCT SYSTEMS FROM H.V.A.C. EQUIPMENT SUCH AS ROOFTOP UNITS, MAKE UP AIR UNITS, FANCOIL UNITS, HEAT PUMPS, ENERGY RECOVERY VENTILATORS, FANS AS SHOWN.
  2. ALL DUCTWORK INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH SMACNA LATEST EDITION DUCT STANDARDS.
  3. THIS CONTRACTOR SHALL SUPPLY AND INSTALL ALL DUCTWORK INCLUDING APPURTENANCES, HANGERS, DAMPERS, ETC.
- ALL EXPOSED ROUND DUCTWORK SHALL BE ROUND SPIRAL CONDUIT CONSTRUCTED OF ZINC COATED STEEL: ACCEPTABLE PRODUCT: UNITED SHEET METAL CO. SHOP FABRICATED DUCTWORK AND FITTINGS CONSTRUCTED IN A MANNER SIMILAR TO THE FACTORY TYPE SPECIFIED WILL BE ACCEPTED.

CONDUIT SIZE	GAUGE OF METAL
8" AND SMALLER	26
9" TO 22"	24
24" TO 36"	22

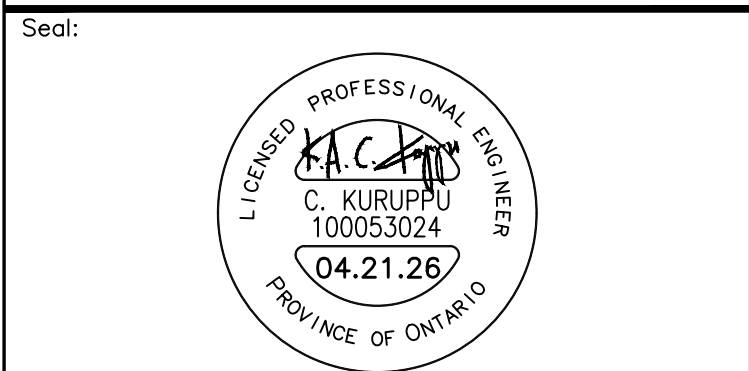
RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET METAL OF THE FOLLOWING U.S. STANDARD GAUGES:

DUCTS UP TO 12" ON LONGEST DIMENSION 26 GA.  
 DUCTS 13" TO 28" ON LONGEST DIMENSION 24 GA.  
 DUCTS 29" TO 48" ON LONGEST DIMENSION 22 GA.

4. BALANCING DAMPERS SHALL BE CONSTRUCTED FROM GALVANIZED STEEL 2 GAUGES HEAVIER THAN THE DUCTWORK IN WHICH THEY ARE INSTALLED C/W LOCKING QUADRANT AND INDICATING DEVICE.
5. PROVIDE FIRE DAMPERS WHICH CONFORM TO NFPA REGULATIONS, BEAR ULC LABEL, AND HAVE APPROVAL OF DFC. DAMPERS TO BE TYPE 'B' AND INSTALLED IN DUCTWORK AT FIRE SEPARATIONS WHETHER SHOWN OR NOT.
6. ALL DUCTWORK SHALL BE SEALED USING DURO-DYNE S-2 DUCT SEALER THROUGHOUT ALL SEAMS AND JOINTS.
7. PROVIDE ACCESS DOORS WHERE REQUIRED FOR SERVICING OR OPERATING OF MECHANICAL EQUIPMENT.
8. PROVIDE 4" FLEXIBLE DUCT CONNECTIONS ON BOTH INLET AND OUTLET DISCHARGE SIDES OF EACH FAN, AIR HANDLING ROOFTOP UNIT, ETC. PROVIDE VIBRATION ISOLATORS.
9. INSULATION, JACKETS AND ADHESIVES SHALL BE INCOMBUSTIBLE AND IN COMPLIANCE WITH ONTARIO BUILDING CODE. PRODUCTS CONTAINING ASBESTOS SHALL NOT BE USED.
10. ALL INSULATION PRODUCTS USED SHALL BE FULLY TESTED AND APPROVED AS FIRE RETARDANT BY UNDERWRITERS LABORATORIES OF CANADA LIMITED.

REVISIONS

No.	ISSUE	DATE
A	ISSUED FOR COORDINATION	2026.03.18
B	ISSUED FOR TENDER	2026.04.16
C	ISSUED FOR PERMIT	2026.04.21



DO NOT SCALE DRAWINGS.  
 ALL DIMENSIONS TO BE CHECKED AND VERIFIED ON THE JOB. ALL DRAWINGS REMAIN THE PROPERTY OF ENGINEERS. DRAWINGS SHOULD NOT BE READ IN ISOLATION.

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PROJECT:  
**1 HAMILTON STREET  
 SOUTH, WATERDOWN  
 SERVICE UPGRADE**

DRAWING TITLE:  
**MECHANICAL  
 SPECIFICATION-1**

DRAWN BY: R.K.	SCALE: N.T.S.
CHECKED BY: D.H.	DATE:

PROJECT No.:  
**25037**

DRAWING No.:  
**M1.01**

**MECHANICAL SPECIFICATIONS**

11. MATERIALS SHALL BE OF CANADIAN MANUFACTURE WHERE AVAILABLE, OF BEST QUALITY OF THEIR RESPECTIVE KINDS AND OF UNIFORM PATTERN THROUGHOUT.
12. ALL INSULATING MATERIALS SHALL BE FIRE RETARDANT. ADHESIVES SHALL BE WATERPROOF AND INCOMBUSTIBLE FLAME RESISTANT. COMBUSTIBLE WRAPPINGS OR VAPOUR BARRIERS USED IN CONJUNCTION WITH THERMAL INSULATING MATERIALS SHALL BE TREATED TO REDUCE THEIR COMBUSTIBILITY SO THAT FLAME SPREAD CLASSIFICATION OF ENTIRE ASSEMBLY, AS DETERMINED ACCORDING TO METHOD OF FIRE HAZARD CLASSIFICATION FOR BUILDING MATERIALS A.S.T.M. #84-68, SHALL NOT EXCEED 25 AND SMOKE DEVELOPED NUMBER SHALL NOT EXCEED 50. SUBMIT REPORT FROM AN APPROVED TESTING LABORATORY CONFIRMING FOREGOING RATINGS.
13. WHEAT PASTES SHALL NOT BE USED.
14. THE CONSULTANT RESERVES RIGHT TO DEMAND TEST SAMPLES TO COMPOSITE INSULATION SYSTEMS FOR FIRE HAZARD TEST RATING.
15. BANDS AND CLIPS TO SECURE INSULATION AROUND DUCTS SHALL BE ½" ALUMINIUM BANDS.
16. DUCTWORK SHOWN CROSS HATCHED SHALL BE ACOUSTICALLY LINED WITH 1" THICK RIGID FIBERGLASS COVERED WITH BLACK PLASTIC COATED MAT FACING. SEAL ENDS. STANDARD OF ACCEPTANCE JOHNS-MANVILLE LINACOUSTIC OR APPROVED EQUAL. ALL DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR DIMENSIONS OF DUCTS NOT INCLUDING LINING & INSULATION. CONTRACTOR TO UPSIZE THE DUCT DIMENSIONS BASED ON REQUIRED ACOUSTICAL INTERNAL LINING.
17. INSULATE THE FOLLOWING DUCTWORK, PIPING, FITTINGS AND COMPONENTS:
  - MAIN SUPPLY AND RETURN DUCTWORK CONNECTED TO H.V.A.C. EQUIPMENT
  - BRANCH DUCTS AND TAKE OFFS INCLUDING FLEXIBLE DUCTS
  - OUTDOOR AIR INTAKE AND EXHAUST AIR OUTLET DUCTS AND PLENUMS
  - HEATING HOT WATER SUPPLY AND RETURN
  - HEAT PUMPS SUPPLY AND RETURN
  - REFRIGERANT PIPING
18. ALL CONCEALED SUPPLY AND RETURN AIR DUCTS: 1" (25 MM) THICK GLASS FIBRE 12 KG/M<sup>3</sup> DENSITY (FOR RECTANGULAR DUCTS) OR 24 KG/M<sup>3</sup> DENSITY (FOR ROUND DUCTS) DUCT INSULATION WITH REINFORCED FOIL FACED FLAME RESISTANT KRAFT VAPOUR BARRIER. INSULATION SHALL HAVE MAXIMUM VAPOUR TRANSMISSION RATE OF 0.02 PERMS AND MINIMUM THERMAL RESISTANCE OF 0.75 M<sup>2</sup>K/W (FOR 1" THICKNESS). DUCT INSULATION VALUE OF R-6 (IN UNCONDITIONED SPACES) OR R-2 (INSIDE RETURN AIR PLENUMS).
19. ANY EXPOSED DUCTWORK ON ROOF SHALL BE INSULATED WITH 3" (75 MM) OF INSULATION WITH MINIMUM R12. INSULATION ON THE TOP OF THE DUCTWORK SHOULD BE INSTALLED IN SUCH A MANNER AS TO ALLOW FOR WATER SHED FROM THE TOP OF THE DUCT TO PREVENT WATER FROM PONDING. PROVIDE "3M VENTURECLAD" FLEXIBLE UV RESISTANT, WEATHER PROOFING JACKETING AND VAPOUR BARRIER.
20. HOT WATER HEATING PIPING: HEAVY DENSITY GLASS FIBRE PREFORMED PIPE INSULATION WITH MAXIMUM OF 0.033 W/M-K CONDUCTIVITY AT 24°C MEAN WITH FACTORY APPLIED VINYL FOIL KRAFT LAMINATED GLASS FIBRE REINFORCED FIRE RESISTIVE VAPOUR BARRIER JACKET WITH NOT MORE THAN 1.15 PERM RATING (ASJ) WITH SEALED LAPPED JOINTS. USE 1" (25 MM) THICKNESS ON PIPING UP TO 1-1/2" (38 MM) SIZE, AND 2" (50 MM) THICKNESS ON PIPING 1-1/2" (38 MM) AND ABOVE.
22. REFRIGERANT PIPING: ALL PIPEWORK (BOTH SUCTION AND LIQUID LINES) SHALL BE INSULATED WITH SLIP ON CLOSE CELL ELASTOMERIC PIPE INSULATION (AS MANUFACTURED BY ARMAFLEX OR EQUAL AND APPROVED) HAVING A WALL THICKNESS OF NOT LESS THAN 0.5" (13 MM).

**L. AIR TESTING AND BALANCING**

1. BALANCE AND ADJUST EACH FAN. SYSTEM VOLUMES SHALL BE WITHIN 5% OF REQUIREMENTS SHOWN. ADJUST AND SET BALANCE DAMPERS, FANS AND DRIVES TO GIVE THE SPECIFIED VOLUMES AT ALL OUTLETS. THE BALANCING OF AIR SYSTEMS IS TO BE DONE BY A BALANCING FIRM SPECIALIZING IN THIS WORK. CLEAN DUCT SYSTEMS, FILTERS, ETC., BEFORE TESTING IS DONE.
2. PROVIDE ELECTRONIC PDF COPIES OF THE AIR BALANCING REPORT. AIR QUANTITIES AT EACH OUTLET SHALL BE AS INDICATED IN THE DRAWINGS. THIS REPORT SHALL SHOW THE QUANTITIES, VELOCITIES AND AREA OF EACH OUTLET, TYPE AND MODEL, NUMBER OF FANS AND MOTOR INSTALLED, ACTUAL AIR DELIVERED BY THE FAN WITH TOTAL STATIC PRESSURE AND AMPS DRAWN BY THE MOTORS. ADJUST AND RETEST TO THE SATISFACTION OF THE PROJECT COORDINATOR. PROVIDE ADDITIONAL COPY OF THE AIR BALANCE REPORT TO THE MECHANICAL CONSULTANT.
3. UPON COMPLETION OF THE AIR BALANCE TEST, SUBMIT THE AIR BALANCE REPORT TO THE OWNER. THIS CONTRACTOR SHALL PROVIDE, IF CALLED FOR, A SPOT CHECK ON THE SYSTEM WITH THE CONSULTANT. IF ACTUAL AIR QUANTITIES DO NOT AGREE WITH THE AIR BALANCE REPORT DATA, THIS CONTRACTOR MAY BE CALLED UPON TO COMPLETELY REBALANCE THE SYSTEM UNTIL REQUIREMENTS ARE ACHIEVED AND ACCEPTED BY THE CONSULTANT.

**M. MECHANICAL DEMOLITION**

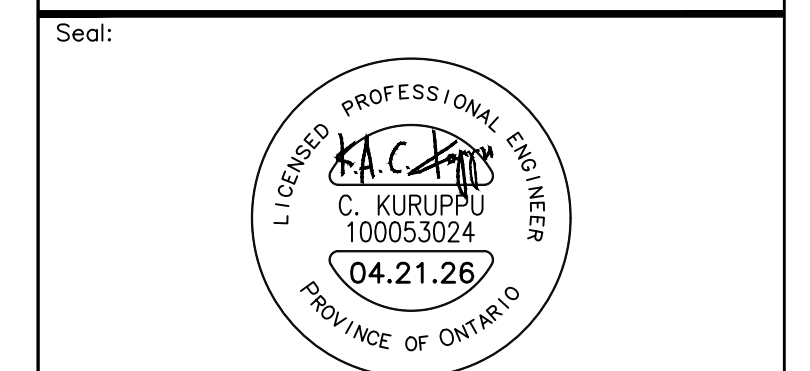
1. PROVIDE LABOUR, MATERIALS, PRODUCTS, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE THE DEMOLITION WORK SPECIFIED HEREIN.
2. REFER TO DRAWINGS FOR EXTENT OF DEMOLITION WORK. THE DRAWINGS INDICATE THE APPROXIMATE LOCATIONS OF SERVICES AS FAR AS THESE ARE KNOWN.
3. DISPOSE, OFF SITE, OF ALL DEBRIS IN ACCORDANCE WITH THE JURISDICTIONAL AUTHORITIES.
4. REMOVAL AND STORAGE OF SALVAGEABLE ITEMS AS DIRECTED BY THIS SPECIFICATION SECTION AND THE OWNER OF THEIR REPRESENTATIVE.
5. MEET THE REQUIREMENTS AND RECOMMENDATIONS OF ALL MUNICIPAL, PROVINCIAL AND FEDERAL BYLAWS AND ORDINANCES.
6. EXECUTE THIS WORK IN ACCORDANCE WITH THE LATEST EDITION OF THE FOLLOWING CODES AND STANDARDS.
  - CAN/CSA-S350-M1980 - CODE OF PRACTICE FOR SAFETY IN DEMOLITION OF STRUCTURES.
  - ONTARIO BUILDING CODE.
  - OCCUPATIONAL HEALTH AND SAFETY ACT.
  - REGULATIONS FOR CONSTRUCTION PROJECTS.
  - ONTARIO FIRE CODE.
  - REGULATIONS UNDER FIRE MARSHALS ACT.
7. REMOVAL FROM SITE AND DISPOSAL OF DEBRIS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL JURISDICTIONAL AUTHORITIES.
8. ARRANGE AND PAY FOR ALL PERMITS, NOTICES AND INSPECTIONS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE DEMOLITION WORK.
9. ALL MATERIALS WHICH HAVE NOT BEEN DESIGNATED FOR SALVAGE FROM THE DEMOLITION SHALL BECOME THE PROPERTY OF THE CONTRACTOR. REMOVE ALL MATERIAL AND DEBRIS FROM THE SITE AS QUICKLY AS POSSIBLE AND DISPOSE OF LEGALLY. BURNING OF DEBRIS OR SELLING OF MATERIALS ON THE SITE WILL NOT BE PERMITTED.
10. CONFORM TO REQUIREMENTS OF MUNICIPALITY'S WORKS DEPARTMENT REGARDING DISPOSAL OF WASTE MATERIALS.
11. MATERIALS PROHIBITED FROM MUNICIPALITY WASTE MANAGEMENT FACILITIES SHALL BE REMOVED FROM SITE AND DISPOSED OF THROUGH RECYCLING COMPANIES SPECIALIZING IN RECYCLABLE MATERIALS.
12. AT THE END OF EACH WORK SHIFT, LEAVE WORK IN A SAFE CONDITION.
13. DEMOLISH WORK INTO SECTIONS OF PRACTICAL SIZE FOR REMOVAL WITHOUT ALTERATION OR DAMAGE TO EXISTING BUILDING.
14. STORE MATERIALS ONLY IN AREAS DESIGNATED BY THE OWNER AND AS PERMITTED BY THE LOCAL JURISDICTIONAL AUTHORITIES.
15. MATERIALS AND DEBRIS SHALL NOT BE STACKED IN BUILDING TO THE EXTENT THAT OVERLOADING OF ANY PART OF THE STRUCTURE WILL OCCUR.

16. CONFER WITH THE OWNER CONCERNING SCHEDULE, DUST AND NOISE CONTROL PRIOR TO COMMENCING WORK IN OR ADJACENT TO EXISTING FACILITIES WHERE SUCH WORK MIGHT AFFECT EITHER THOSE FACILITIES OR THEIR OCCUPANTS.
17. EXECUTE WORK WITH LEAST POSSIBLE INTERFERENCE OR DISTURBANCE TO OCCUPANTS, PUBLIC AND NORMAL USE OF PREMISES.
18. PROVIDE TEMPORARY MEANS TO MAINTAIN SECURITY WHEN SECURITY HAS BEEN REDUCED BY DIVISION 15.
19. ONLY ELEVATORS, DUMBWAITERS, CONVEYORS OR ESCALATORS ASSIGNED FOR CONTRACTOR'S USE MAY BE USED FOR MOVING MEN AND MATERIAL WITHIN BUILDING. PROTECT WALLS OF PASSENGER ELEVATORS, TO APPROVAL OF OWNER PRIOR TO USE. ACCEPT LIABILITY FOR DAMAGE, SAFETY OF EQUIPMENT AND OVERLOADING OF EXISTING EQUIPMENT.
20. PROVIDE TEMPORARY DUST SCREENS, BARRIERS, WARNING SIGNS IN LOCATIONS WHERE RENOVATIONS AND ALTERNATION WORK IS ADJACENT TO AREAS WHICH WILL BE OPERATIVE DURING WORK.
21. PROTECT ALL MECHANICAL SYSTEMS, INDICATED TO REMAIN, FROM DAMAGE.
22. PROVIDE AND MAINTAIN READY ACCESS TO FIRE FIGHTING EQUIPMENT AT ALL TIMES.
23. PROVIDE AND MAINTAIN PROPER AND SUITABLE FIRE EXTINGUISHERS THROUGHOUT THE DURATION OF THE WORK.
24. THE DRAWINGS INDICATE THE APPROXIMATE LOCATIONS OF SERVICES AS FAR AS THESE ARE KNOWN. SHOULD ANY MECHANICAL OR ELECTRICAL SERVICE LINE BE BROKEN, OR DISRUPTED BY OPERATIONS SPECIFIED UNDER THIS CONTRACT, REPAIR SERVICE LINES, AND MAKE GOOD ALL DAMAGE DUE TO THE DISRUPTION OR BREAK, AT NO EXPENSE TO THE OWNER. NOTIFY THE OWNER IMMEDIATELY WHENEVER ANY SERVICE LINE IS BROKEN OR DAMAGED.
25. ACCEPT LIABILITY FOR COSTS INCURRED BY THE OWNER IN REPAIRING AND CLEANING EQUIPMENT, ETC., RESULTING FROM FAILURE TO COMPLY WITH THE ABOVE REQUIREMENTS.
26. USE ONLY THOSE EXISTING ENTRANCES AND STAIRS DESIGNATED BY THE OWNER FOR ACCESS TO AND EGRESS FROM THE EXISTING BUILDINGS AND VARIOUS FLOORS WHERE WORK OF THIS CONTRACT IS TO BE CARRIED OUT. NO TRAFFIC THROUGH OTHER AREAS OF THE BUILDING WILL BE PERMITTED WITHOUT THE PRIOR CONSENT OF THE OWNER.
27. ARRANGE, SCHEDULE AND PERFORM WORK WITH MINIMUM DISTURBANCE TO EXISTING FACILITIES AND SERVICES.
28. SUBMIT A COMPLETE SCHEDULE OF SERVICE INTERRUPTIONS AND CHANGEOVERS WITH APPROXIMATE DATES, REQUIRED DURATIONS AND TIMES OF DAY, FOR APPROVAL BEFORE PROCEEDING.
29. NOTIFY OWNER IN WRITING AT LEAST 72 HOURS IN ADVANCE OF PLANNED INTERRUPTION TO EXISTING SERVICES.
30. INTERRUPTION OF SERVICE MUST OCCUR AT THE TIMES AND FOR THE DURATION STIPULATED BY THE OWNER.
31. KEEP SERVICE INTERRUPTION DURATION TO AN ABSOLUTE MINIMUM. CARRY OUT ALL PREPARATORY WORK, MEASUREMENTS, ETC., WITHOUT INTERRUPTION OF EXISTING SERVICES.
32. IF SERVICE INTERRUPTIONS ARE REQUIRED BY THE OWNER DURING THE NIGHT OR ON WEEKENDS, ETC., PREMIUM TIME SHALL BE INCLUDED AT THE CONTRACT PRICE. NO EXTRA CHARGES WILL BE ALLOWED AT A LATER DATE FOR FAILURE TO INCLUDE SAME.

DRAWING LIST	
M1.01	MECHANICAL SPECIFICATIONS - 1
M1.02	MECHANICAL SPECIFICATIONS - 2, & DRAWING LIST
M1.03	MECHANICAL SCHEDULES, & MECHANICAL LEGEND
M1.04	MECHANICAL SCHEDULE & RISER DIAGRAM
M1.05	MECHANICAL SCHEDULE & SCHEMATIC
M1.06	MECHANICAL DETAILS
M2.01	HVAC ROOF PLAN - DEMOLITION
M3.01	HVAC ROOF PLAN - NEW
M3.02	HVAC BASEMENT PLAN - NEW
P1.01	PLUMBING ROOF PLAN - DEMOLITION
P2.01	PLUMBING BASEMENT PLAN - NEW

**REVISIONS**

No.	ISSUE	DATE
A	ISSUED FOR COORDINATION	2026.03.18
B	ISSUED FOR TENDER	2026.04.16
C	ISSUED FOR PERMIT	2026.04.21



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**CK ENGINEERING INC**  
 MECHANICAL | ELECTRICAL  
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 BURLINGTON, ON L7P 1A5  
 www.ckengs.com | info@ckengs.net | 905.631.1115

PROJECT:  
  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
  
**MECHANICAL  
SPECIFICATION-2 &  
DRAWING LIST**

DRAWN BY: <b>R.K.</b>	SCALE: <b>N.T.S.</b>
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CHECKED BY: <b>D.H.</b>	DATE:
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PROJECT No.:  
**25037**

DRAWING No.:  
**M1.02**

PLUMBING FIXTURE SCHEDULE									
TAG	SPECIFICATION	FIXTURE SIZE	CW (IN)	HW (IN)	WASTE (IN)	VENT (IN)	REMARKS		
MXV	DOMESTIC MIXING VALVE BRADLEY S59-3200 WALL MOUNTED. DELIVER DOMESTIC HOT WATER AT 120°F OF MAXIMUM c/w SS WALL CABINET.	-	2"	2"	-	-	-		
EED	ZURN ZN-211-BF-P, CAST IRON FUNNEL FLOOR DRAIN WITH 5" ROUND NICKEL BRONZE STRAINER, MIFAB MI-GARD, AND 1/2" TRAP PRIMER CONNECTION.	-	-	-	3"	1 1/2"	-		

NOTES:  
1. PROVIDE ALL REQUIRED FITTINGS, TRAPS, VALVES, FAUCETS AND ESCUTCHEONS TO COMPLETE EACH FIXTURE INSTALLATION.  
2. SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL BEFORE ORDERING ANY FIXTURE.  
3. PROVIDE TEMPERATURE GAUGES PER SCHEMATIC.

ROOF TOP ERV UNIT SCHEDULE																								
TAG	SERVICE	MANUFACTURER	MODEL	SUPPLY AIRFLOW		EXTRACT AIRFLOW		ELECTRICAL			WINTER			SUMMER			DX COIL				WEIGHT (LBS)	CONTROLS	REMARKS	
				CFM	E.S.P (INCH)	CFM	E.S.P (INCH)	V/PH/HZ	MCA	MOCP	RECOVERED HEAT(MBH)	SUPPLY AIR TEMP (°F)	EFFECTIVENESS SEN/LAT (%)	RECOVERED HEAT(MBH)	SUPPLY AIR TEMP (°F)	EFFECTIVENESS SEN/LAT (%)	MODEL	COOLING (DESIGN AIRFLOW) CAP (MBH)	LVG TEMP DB/WB(°F)	HEATING (DESIGN AIRFLOW) CAPACITY (MBH)				LVG TEMP DB (°F)
ERV-1,2	ALL FLOORS	SWEGON	GOLD F RX 025	3,750	1.2	4500	1.2	208/3/60	35.44	60	270,000	-4	86.4/83.9	135,000	76.3	-/72.3	3DX-03-24.08-52.0-12	121.40	60.24/56.58	70.00	80.32	2,606	DISCHARGE AIR SETPOINT AT 18°C	HORIZONTAL FRONT DISCHARGE DUCT CONNECTIONS

NOTES:  
1. UNITS TO BE MOUNTED ON NEW STRUCTURAL STEEL FRAME. REFER TO SLEEL FRAME DETAIL IN STRUCTURAL DRAWINGS AND COORDINATE WITH GENERAL CONTRACTOR FOR INSTALLATION.  
2. c/w FACTORY INSTALLED PAC PANEL(MITSUBISHI) w/FACTORY INSTALLED LEV KITS WIRED TO PAC PANEL. PAC PANEL ELECTRIC: 220V/1/60. ALL WIRING TO BE PRE-WIRED WITHIN UNIT ENCLOSURE.  
3. c/w HAND TERMINAL, ROOF FOR OUTDOOR INSTALLATION, INTAKE & EXHAUST AIR COWLS, EC MOTOR FANS. INCLUDE AIRFLOW STATIONS.  
4. UNIT SHALL INCLUDE FACTORY INSTALLED AND TESTED INTAKE CONTROLS TO SEQUENCE ERV UNIT AND INTERFACE DX HEATING SYSTEM. CONTROLS SHALL BE BACNET IP NATIVE AND BTL CERTIFIED.  
5. c/w FACTORY MOUNTED FREEZE STAT IN SUPPLY AIR SECTION.  
6. ALL CASING MUST BE WEATHERPROOF AND GASKETTED HINGED PANELS WHEREVER APPLICABLE. c/w MERV13 AIR FILTER(S) & MERV-8 PRE-FILTERS.  
7. c/w UNIT MOUNTED NON-FUSED DISCONNECT SWITCH w/ SINGLE POINT POWER CONNECTION TO BE WIRED BY ELECTRICAL.  
8. INCLUDE THE FACTORY BUILD TRANSFORMER 208V/3PH TO 575V/3PH  
9. BASIS OF DESIGN: SWEGON, ACCEPTABLE ALTERNATES: OXYGEN8

HEAT PUMP WATER HEATER SCHEDULE																			
TAG	MAKE	MODEL No.	REFRIGERANT	CAPACITY (MBH)			COP			ELECTRICAL					BUILT-IN PUMP		WEIGHT (lbs)	REMARKS	
				10°F	17°F	32°F	10°F	17°F	32°F	V/Hz/Ph	MCA (A)	MOP (A)	BOOSTER (kW)	BACKUP (kW)	TOTAL (kW)	FLOW (gpm)			HEAD (FT)
ASHP-1,2	TRANSOM	HWV210	R410a	179.9	201.0	241.1	2.4	2.5	2.8	208/60/3	184.0	200.0	27.0	27.0	54.0	5.2	19'	1950	REFER TO NOTES BELOW

NOTES:  
1. UNIT TO BE c/w STAINLESS STEEL, BRAZED PLATE TYPE CONSTRUCTION, TWO VARIABLE CAPACITY SCROLL COMPRESSOR AND SINGLE REFRIGERATION CIRCUIT.  
2. c/w VARIABLE SPEED CENTRIFUGAL END SUCTION PUMP.  
3. c/w MICRO PROCESSOR BASED PID CONTROLLER, 1x MAIN CONTROLLER c/w BACnet.  
4. c/w SS BRAZED PLATE CONDENSER HEAT EXCHANGER, c/w HIGH EFF. TUBE AND FIN EVAPORATOR HEAT EXCHANGER.  
5. c/w FACTORY INSTALLED HEAT TRACING ON ALL WETTED PARTS.  
6. BASIS OF DESIGN: TRANSOM, ACCEPTABLE ALTERNATE: WATTS LYNC

DOMESTIC HOT WATER STORAGE TANK SCHEDULE						
TAG	SERVICE	MODEL No.	CAPACITY (GALLONS)	WATER CONNECTION (DIA")	WEIGHT (LBS)	REMARKS
ST-1,2,3	DOMESTIC HOT WATER	AO SMITH TJV-200	200	2"	-	C/W FACTORY INSULATION AND GLASS LINING, TEMPERATURE AND PRESSURE RELIEF VALVE

NOTES:  
1. ACCEPTABLE ALTERNATE: BRADFORD WHITE

EXPANSION TANK SCHEDULE														
TAG	MAKE	MODEL No.	LOCATION	SYSTEM	FLUID	MAX. SYSTEM PRESSURE (PSIG)	TANK VOLUME (GALLONS)	SYSTEM VOLUME (GALLONS)	EXPANSION VOLUME (GALLONS)	ACCEPTANCE VOLUME (GALLONS)	MIN. TEMP. (°F)	MAX. TEMP. (°F)	TANK DIMENSIONS (INCHES)	REMARKS
ET-1	AMTROL	ST-70VC	BOILER ROOM	DOMESTIC WATER	WATER	150	34	-	-	-	-	200	16"x45"H	C/W NPT CONNECTION, NSF/CAN 61 CERTIFIED, STEEL SHELL, HEAVY DUTY BUTYL NSF/CAN 61 DIAPHRAGM

PUMP SCHEDULE														
TAG	SERVICE	MANUFACTURER	MODEL	CONNECTION SIZE (IN)	MATERIAL	FLUID	FLOW (USGPM)	TOTAL FT. HEAD	ELECTRICAL			WEIGHT (LBS)	REMARKS	
									V/PH/HZ	MCA	MOCP			HP/WATT
P-1	DOMESTIC HOT WATER RECIRC	BELL & GOSSETT	ECOCIRC XL 55-45	1-1/2"	STAINLESS STEEL	DOMESTIC WATER	30	40	208/1/60	-	-	1/2HP	28.6	c/w ECM MOTOR

NOTES:  
1. ACCEPTABLE ALTERNATES: TACO, WILO

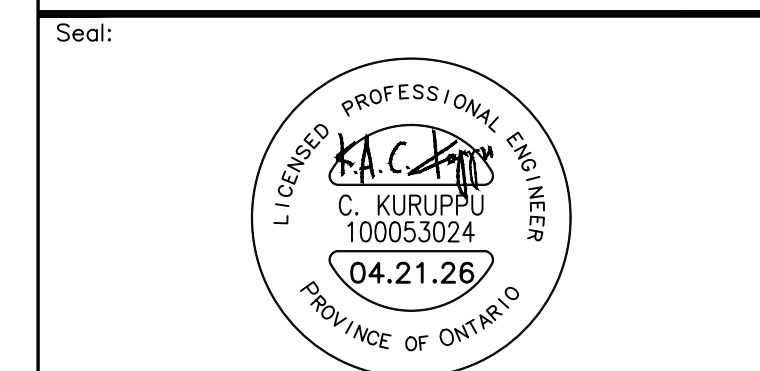
HEAT PUMP UNIT SCHEDULE (CONNECTED TO ERV-1/2)										
TAG	SERVICE	MANUFACTURER	MODEL	HEATING (Btu/h)	COOLING (Btu/h)	ELECTRICAL			WEIGHTS (LBS)	REMARKS
						V/PH/HZ	MCA	MOCP		
CU-1,2	ERV-1/2	MITSUBISHI	PURY-HP120 TNU-A1	135,000	120,000	208/3/60	66	100	653	-

NOTES:  
1. UNIT TO BE MOUNTED ON STEEL FRAME.  
2. c/w LOW AMBIENT HEATING DOWN TO -13F  
3. INSULATE BOTH LIQUID/GAS REFRIGERANT PIPES.  
4. BASIS OF DESIGN: MITSUBISHI, ACCEPTABLE ALTERNATE: DAIKIN

MECHANICAL LEGEND			
HVAC		ANNOTATION LEGEND	
BD	DUCT WORK	CTE	CONNECT TO EXISTING
CD	BALANCING DAMPER	T/B	TO BELOW
R.A.	CONSTANT AIRFLOW REGULATOR	T/A	TO ABOVE
S.A.	RETURN AIR DUCT	F/B	FROM BELOW
⊙	SUPPLY AIR DUCT	F/A	FROM ABOVE
⊙	THERMOSTAT	PIPING/PLUMBING	
FD	FIRE DAMPER	-----	DOMESTIC COLD WATER (DCW)
⊗	SUPPLY TURNING DOWN	-----	DOMESTIC HOT WATER (DHW)
⊗	RETURN OR EXHAUST DOWN	-----	DOMESTIC HOT WATER RECIRCULATION (DHWR)
⊙-1	HVAC EQUIPMENT TAG	-----	PIPES & BRANCHES TURNING DN
⊗-XXXXX	EXISTING DUCTWORK TO BE REMOVED	-----	GAS LINE
		-----	PIPE HEAT TRACING
		-----	EXISTING PIPING TO BE REMOVED
		-----	HEATING WATER RETURN (HWR)
		-----	HEATING WATER SUPPLY (HWS)
		-----	GATE VALVE
		-----	GLOBE VALVE
		-----	BALL VALVE
		-----	CHECK VALVE
		-----	RELIEF VALVE
		-----	BACKFLOW PREVENTER
		-----	UNION
		-----	PRESSURE GAUGE WITH GAUGE COCK
		-----	THERMOMETER
		-----	STRAINER
		-----	PUMP
		-----	FUNNEL FLOOR DRAIN
		-----	HUB DRAIN
		-----	ROOF DRAIN
		-----	HUB VENT

REVISIONS		
No.	ISSUE	DATE
A	ISSUED FOR COORDINATION	2026.03.18
B	ISSUED FOR TENDER	2026.04.16
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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**MECHANICAL  
SCHEDULES &  
MECHANICAL LEGEND**

DRAWN BY: R.K. SCALE: N.T.S.

CHECKED BY: D.H. DATE:

PROJECT No.: **25037**

DRAWING No.: **M1.03**

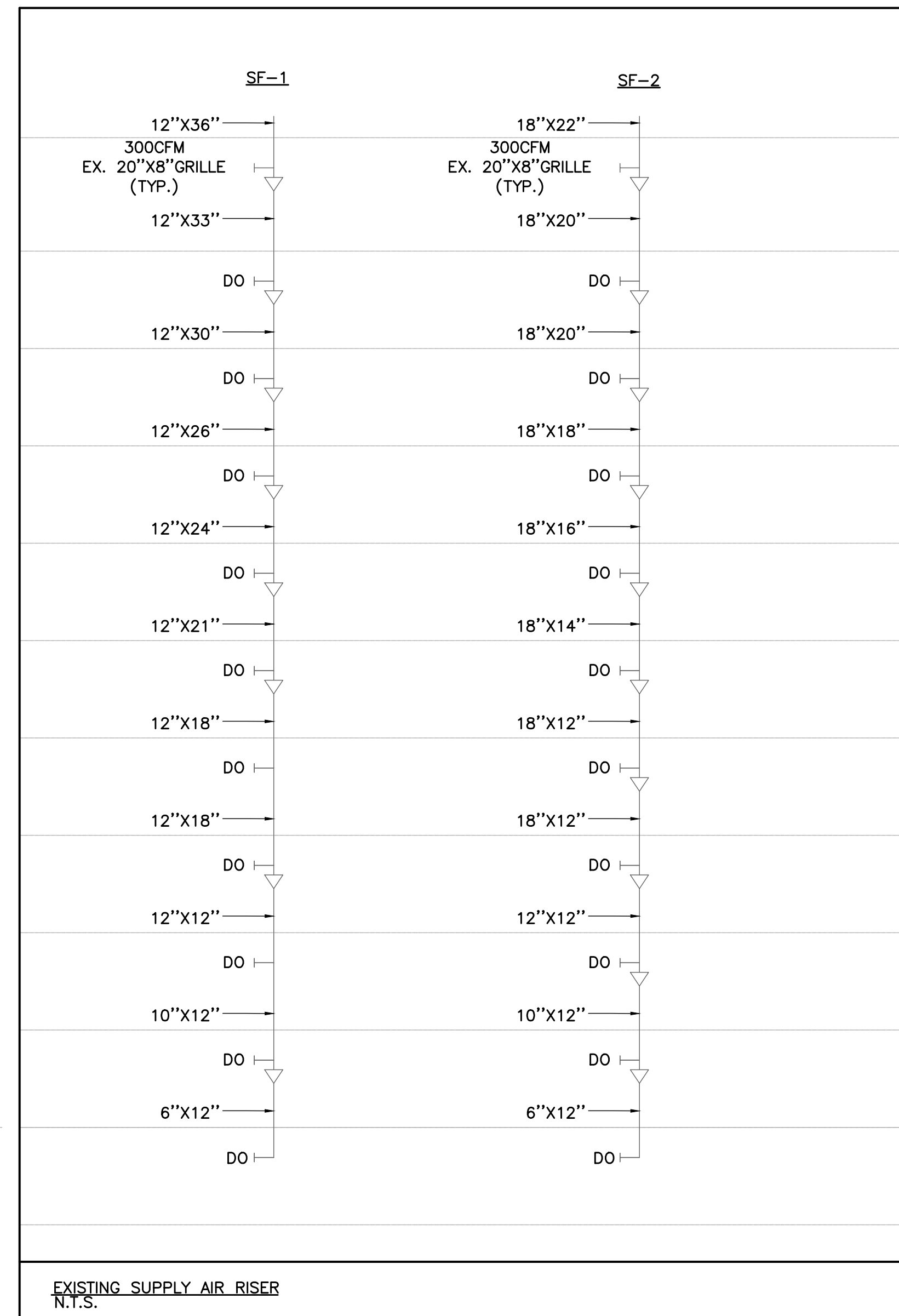
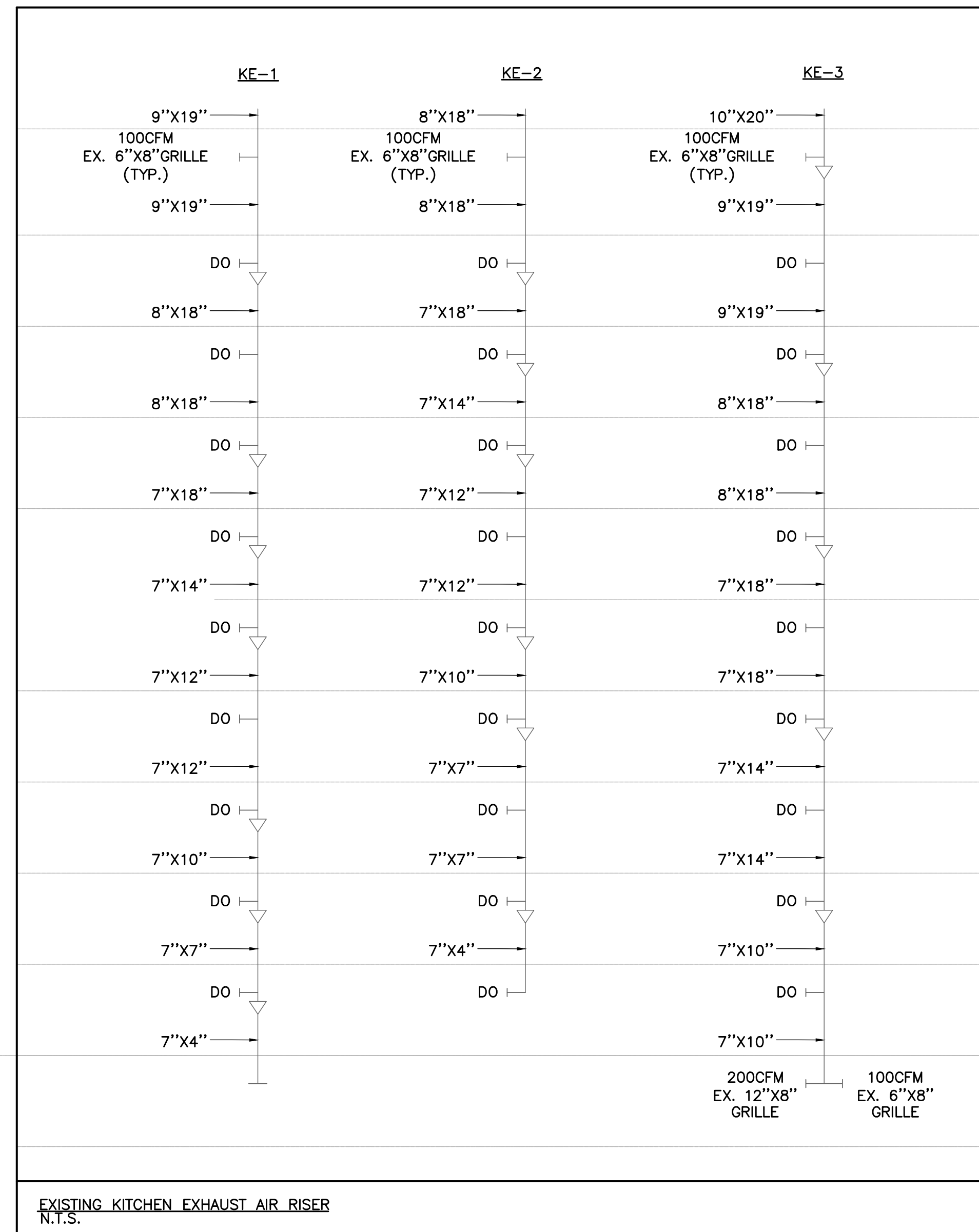
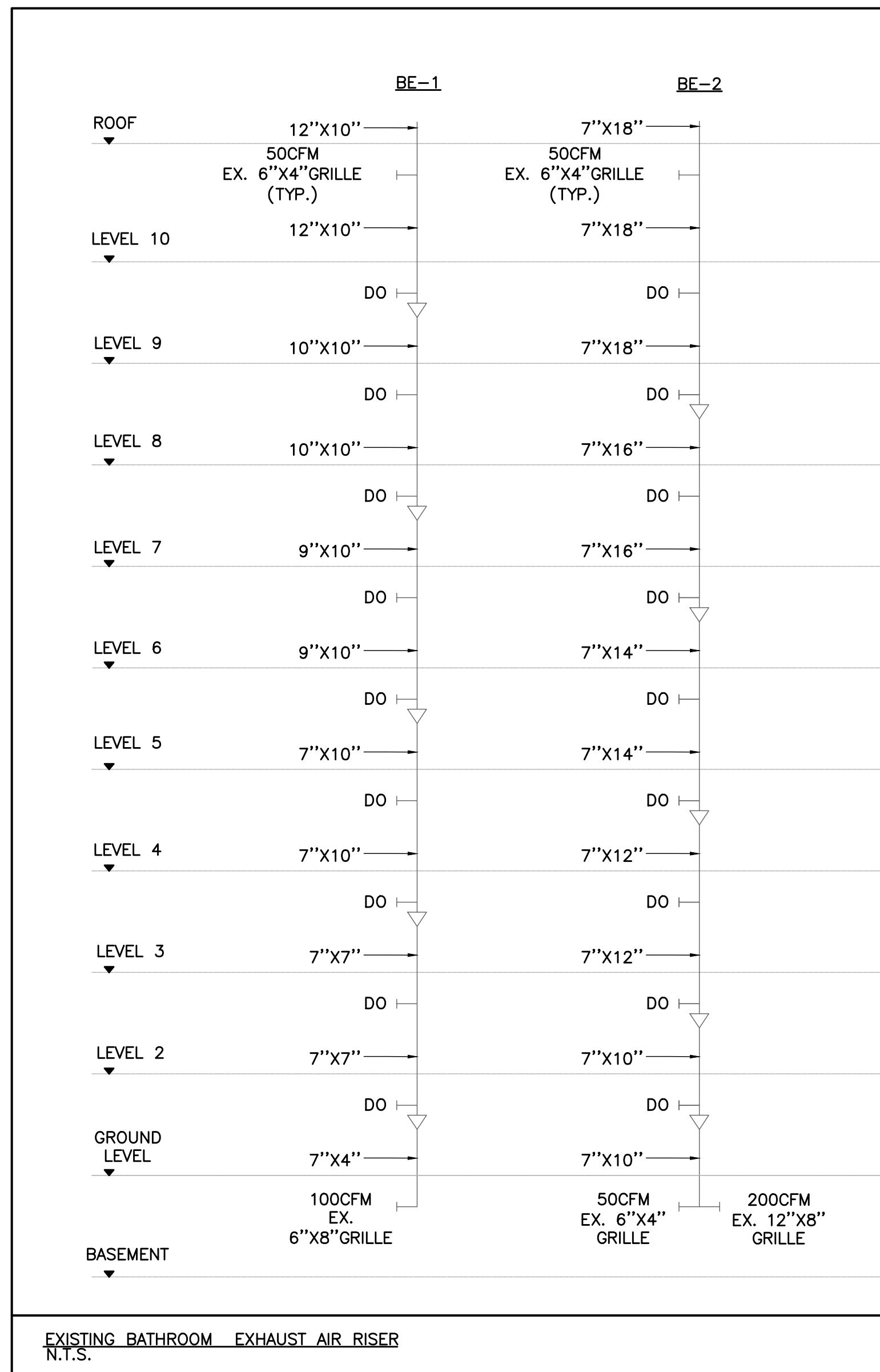
SPLIT AC UNIT SCHEDULE																
OUTDOOR UNIT							INDOOR UNIT									
TAG	MANUFACTURER	MODEL No.	ELECTRICAL			WEIGHT (LBS)	TAG	SERVICE AREA	MODEL No.	MAX AIRFLOW (CFM)	COOLING CAPACITY (BTU/HR)	HEATING CAPACITY (BTU/HR)	ELECTRICAL		WEIGHT (LBS)	REMARKS
			V/PH/HZ	MCA	MOCP								V/PH/HZ	MCA		
CU-3	MITSUBISHI	PUMY-P60NKMU4	208/1/60	-	-	300	AC-1	NEW ELECTRICAL ROOM	PKFY-P30NKMU-E2-TH	920	30,000	34,000	208/1/60	0.63	46	WALL MOUNTED
							AC-2	NEW ELECTRICAL ROOM	PKFY-P30NKMU-E2-TH	920	30,000	34,000	208/1/60	0.63	46	WALL MOUNTED
CU-4	MITSUBISHI	PUMY-P60NKMU4	208/1/60	-	-	300	AC-3	NEW ELECTRICAL ROOM	PKFY-P30NKMU-E2-TH	920	30,000	34,000	208/1/60	0.63	46	WALL MOUNTED
							AC-4	NEW ELECTRICAL ROOM	PKFY-P30NKMU-E2-TH	920	30,000	34,000	208/1/60	0.63	46	WALL MOUNTED

NOTES:  
 1. INSTALL CONDENSING UNIT OUTSIDE THE BUILDING AS PER MANUFACTURER'S INSTRUCTIONS.  
 2. c/w WALL BRACKETS (PROVIDED BY UNIT SUPPLIER).  
 3. PROVIDE SNOW AND WIND BAFFLES AROUND OUTDOOR UNIT WHERE REQUIRED.  
 4. REFRIGERANT PIPING, INSULATION, AND INSTALLATION TO BE PER MANUFACTURER'S RECOMMENDATIONS.  
 5. PROVIDE CONDENSATE DRAIN OR PUMP AS REQUIRED BY SITE CONDITIONS.  
 6. PROVIDE ELECTRICAL CONNECTION WITH DISCONNECT SWITCH AS PER ELECTRICAL DIVISION.  
 7. ACCEPTABLE EQUIVALENT: LG, DAIKIN

NOTES:  
 1. UNIT TO BE INSTALLED PER MANUFACTURER'S WRITTEN INSTRUCTIONS.  
 2. INDOOR UNIT TO BE SEPARATELY POWERED PER SCHEDULE.  
 3. c/w SIMPLE WIRELESS LOCAL REMOTE CONTROLLER (PAR-FL32MA-E).  
 4. ALL EXPOSED CONDENSATE AND REFRIGERANT PIPING TO RUN CONCEALED WITHIN LINE-SET COVERS  
 5. PROVIDED BY THE UNIT SUPPLIER (MITSUBISHI).  
 6. HEATING MODE TO BE DISABLED BY DIP SWITCH FOR YEAR AROUND COOLING OPERATION.  
 7. c/w CONDENSATE DRAIN PUMP(PAC-SK01DM-E).

HOT WATER HEATER SCHEDULE											
TAG	SERVICE	MANUFACTURE	MODEL	ELECTRICAL DATA (V/PH/HZ)	ELEMENT WATTAGE	RECOVERY AT 100' RISE (USGHP)		STORAGE CAPACITY (USGAL)	WATER CONNECTION DIA. (IN)	APPROX. SHIPPING WEIGHT (LBS)	REMARKS
						NON-SIMULTANEOUS WIRING	SIMULTANEOUS WIRING				
HWT	DOMESTIC HOT WATER	A.O.SMITH	DRE-120-24	208/3/60	24KW (4x6KW ELEMENTS)	25	98	119	1 1/4 "	390	SEE NOTE 1

NOTES:  
 1. ACCEPTABLE EQUIVALENT: BRAFDOR WHITE, RHEEM.



REVISIONS		
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A	ISSUED FOR COORDINATION	2026.03.18
B	ISSUED FOR TENDER	2026.04.16
C	ISSUED FOR PERMIT	2026.04.21



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PROJECT:  
**1 HAMILTON STREET  
 SOUTH, WATERDOWN  
 SERVICE UPGRADE**

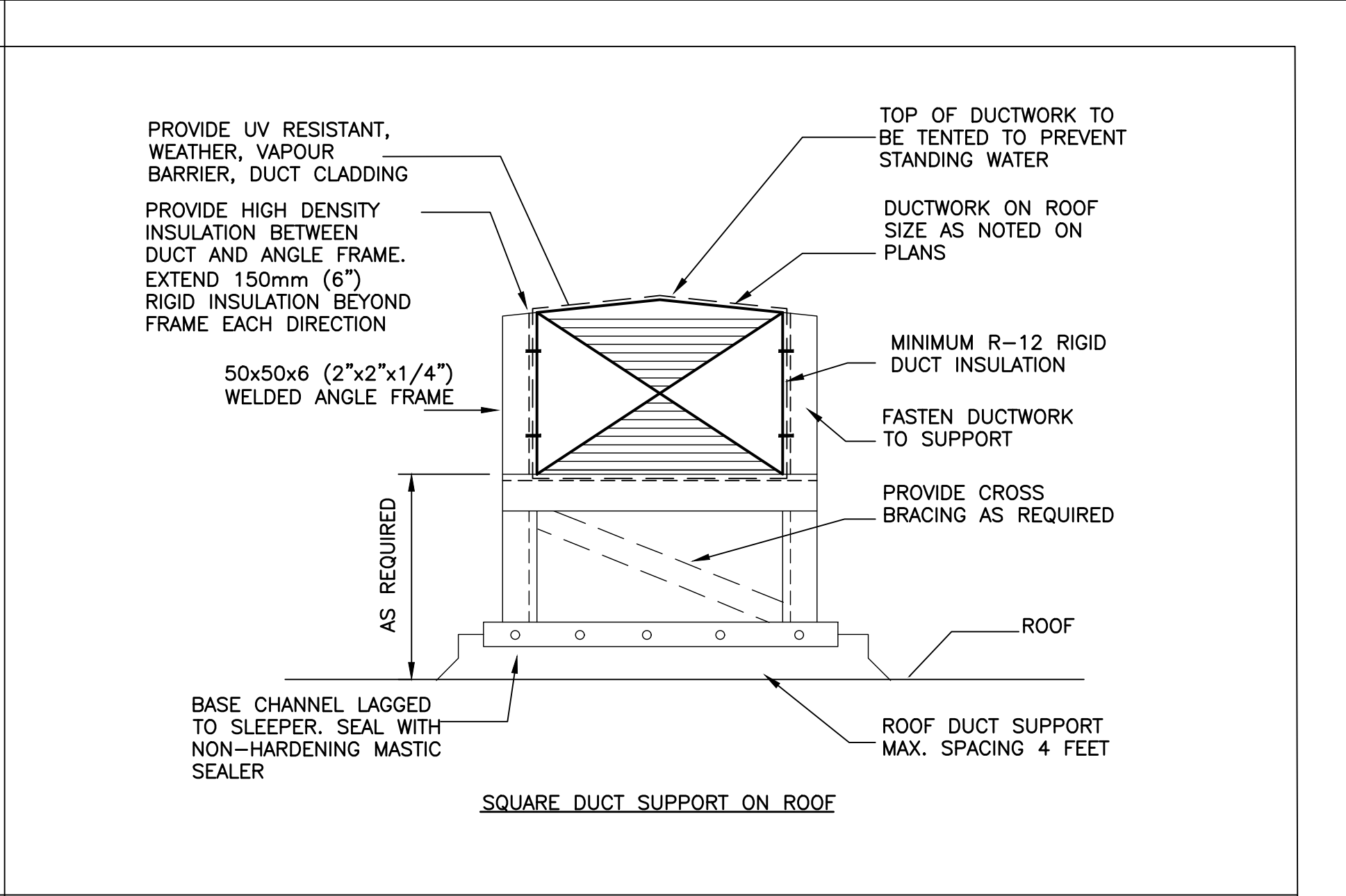
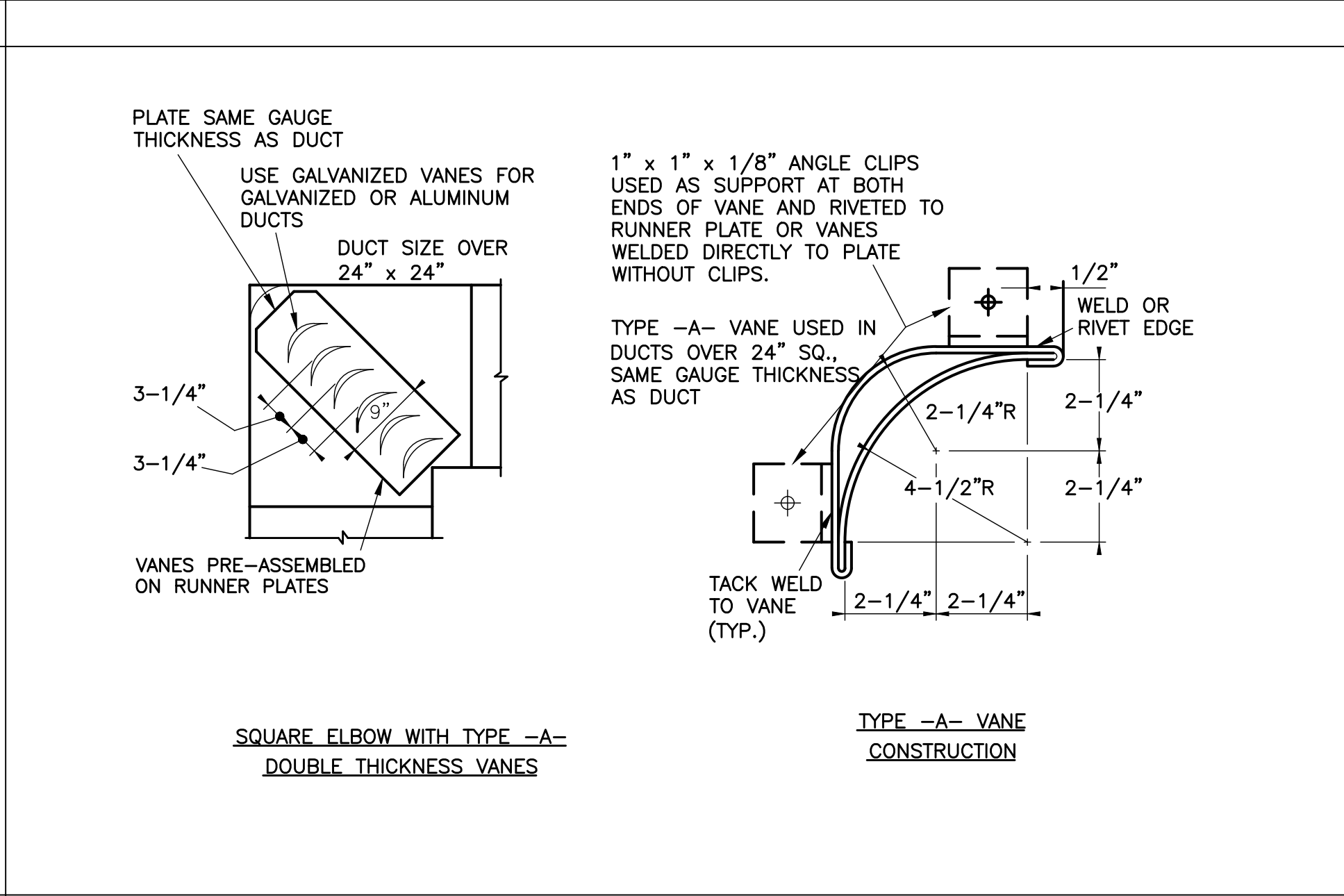
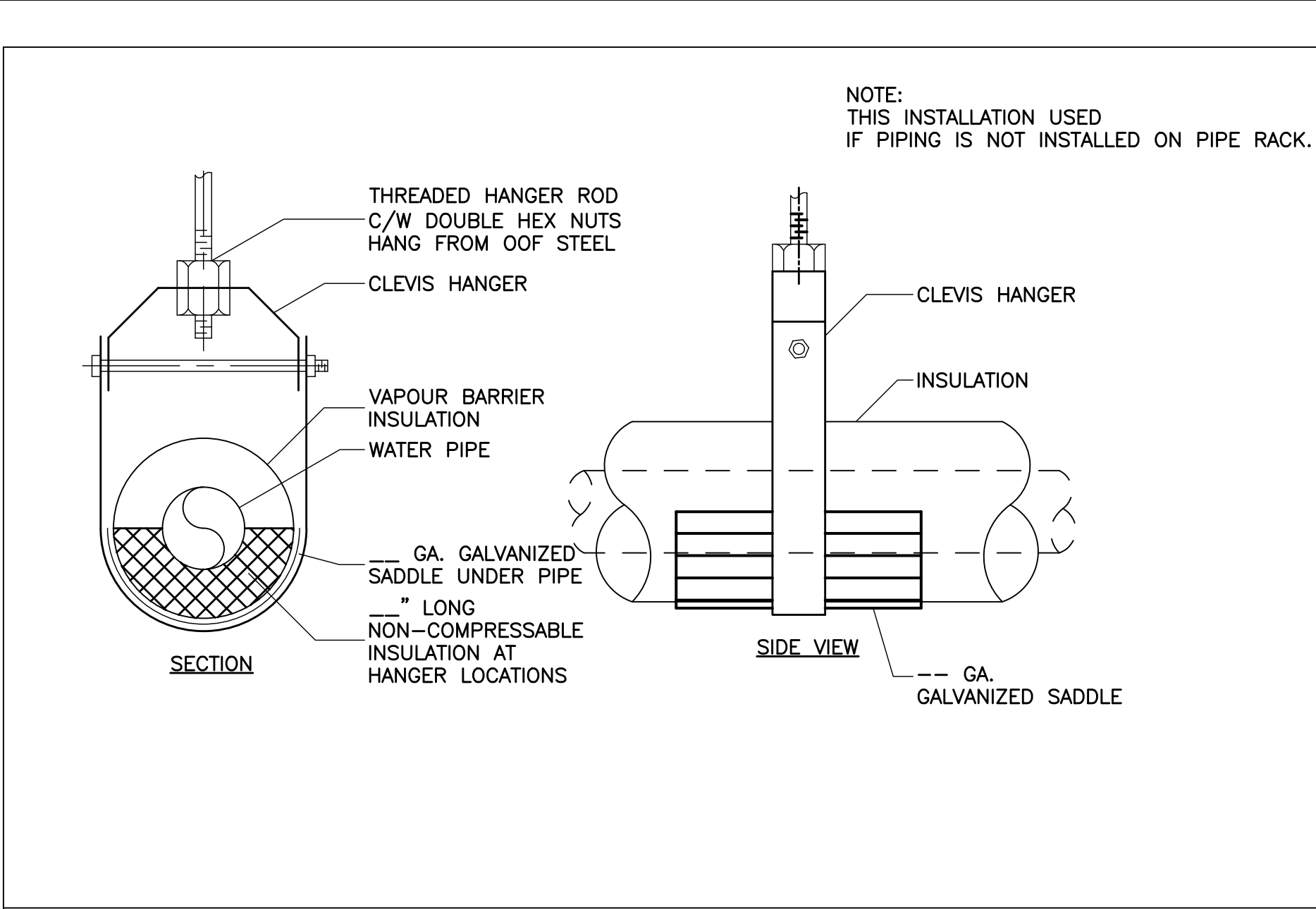
DRAWING TITLE:  
**MECHANICAL  
 SCHEDULES & RISER  
 DIAGRAM**

DRAWN BY: R.K. SCALE: N.T.S.

CHECKED BY: D.H. DATE:

PROJECT No.: **25037**

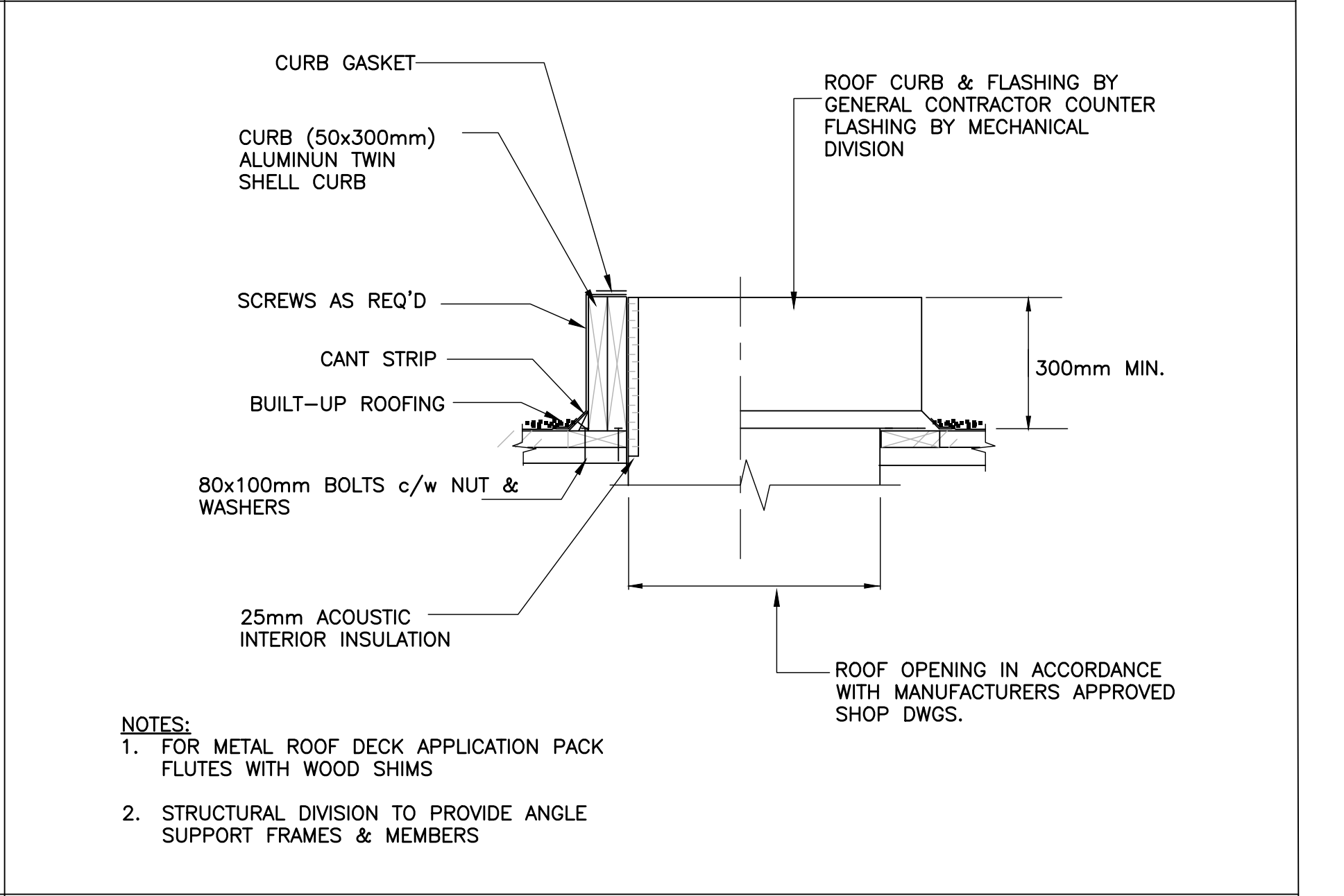
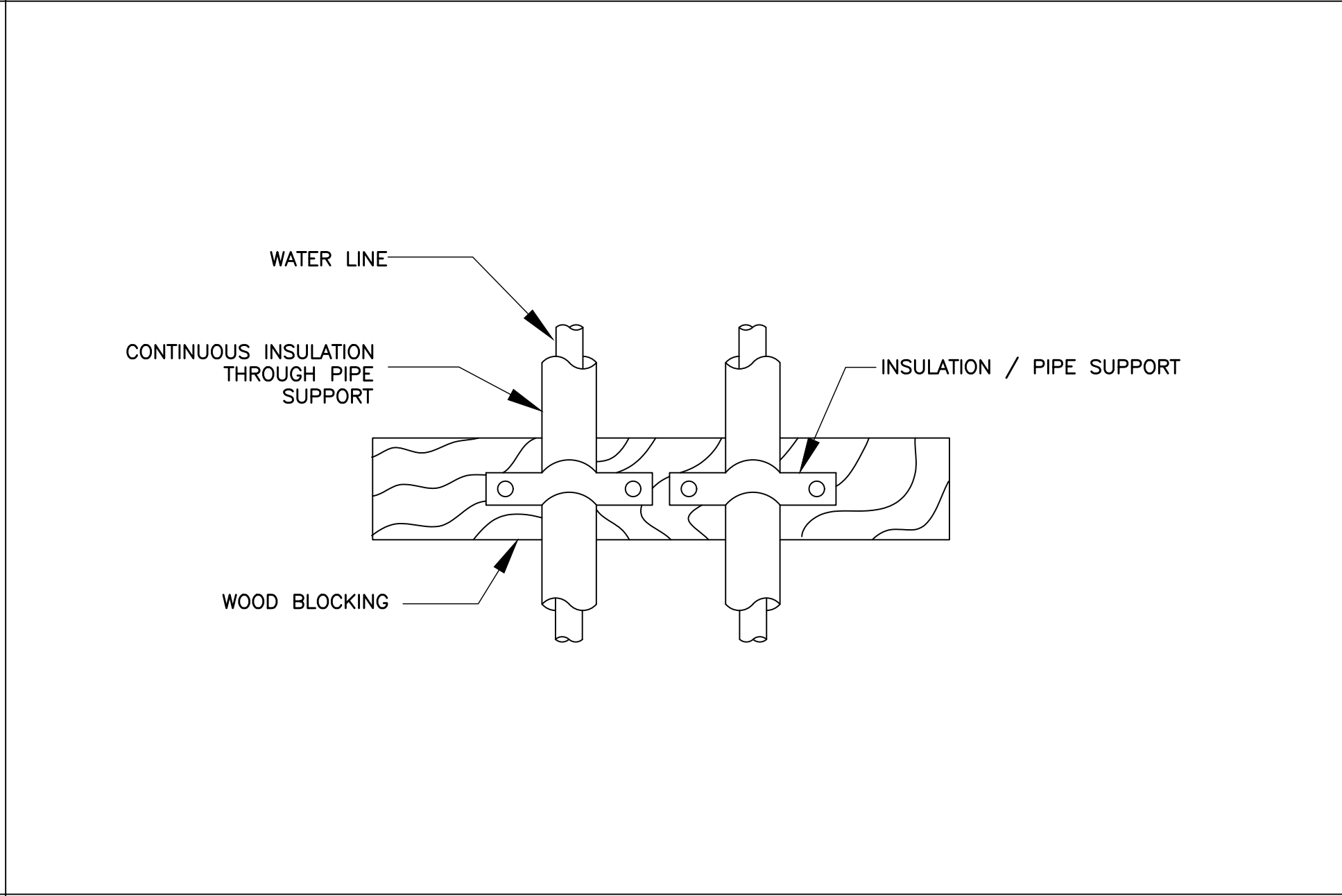
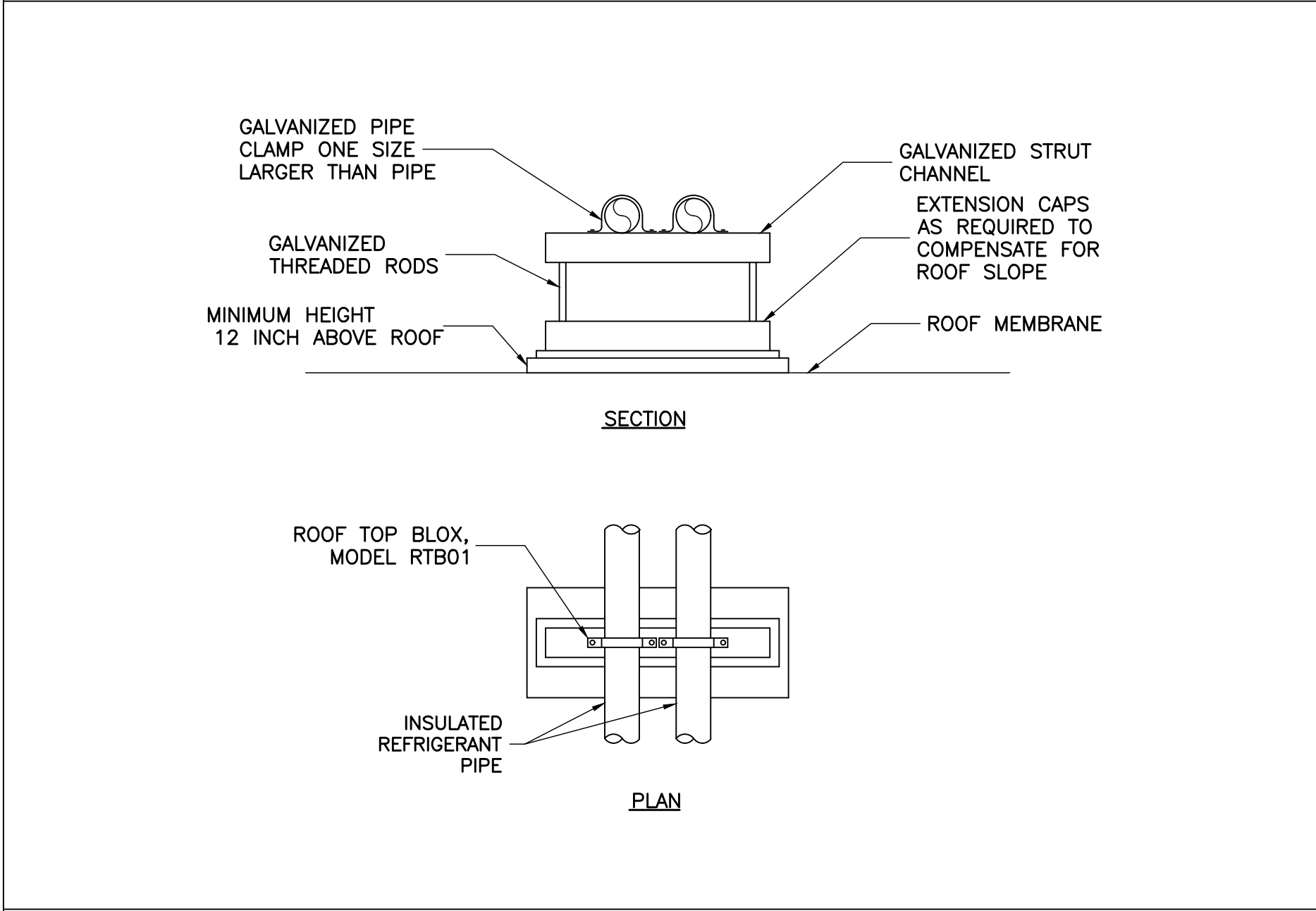
DRAWING No.: **M1.04**



TYPICAL WATER PIPING SUPPORT DETAIL  
N.T.S.

SQUARE ELBOW WITH TURNING VANES DETAIL  
N.T.S.

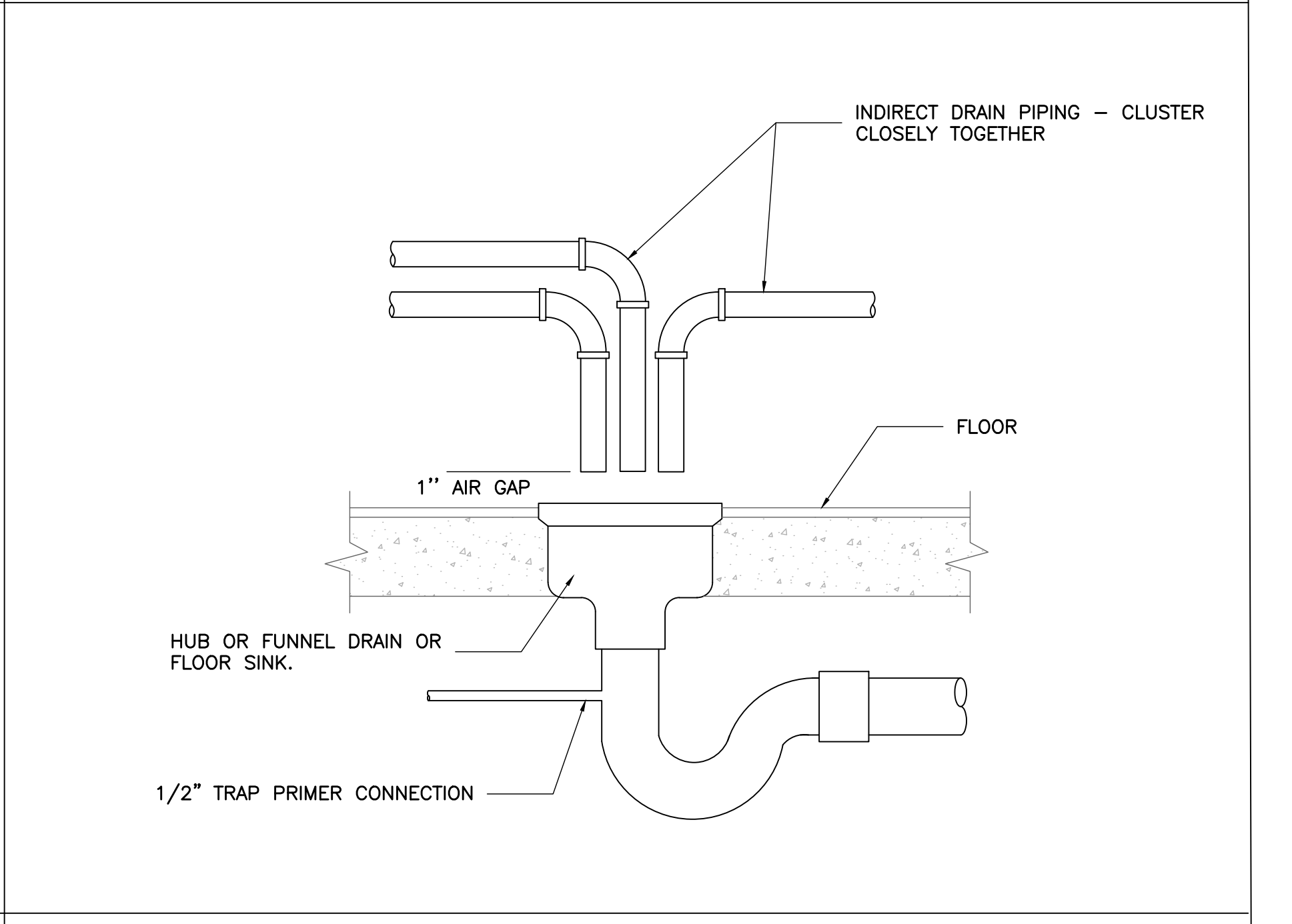
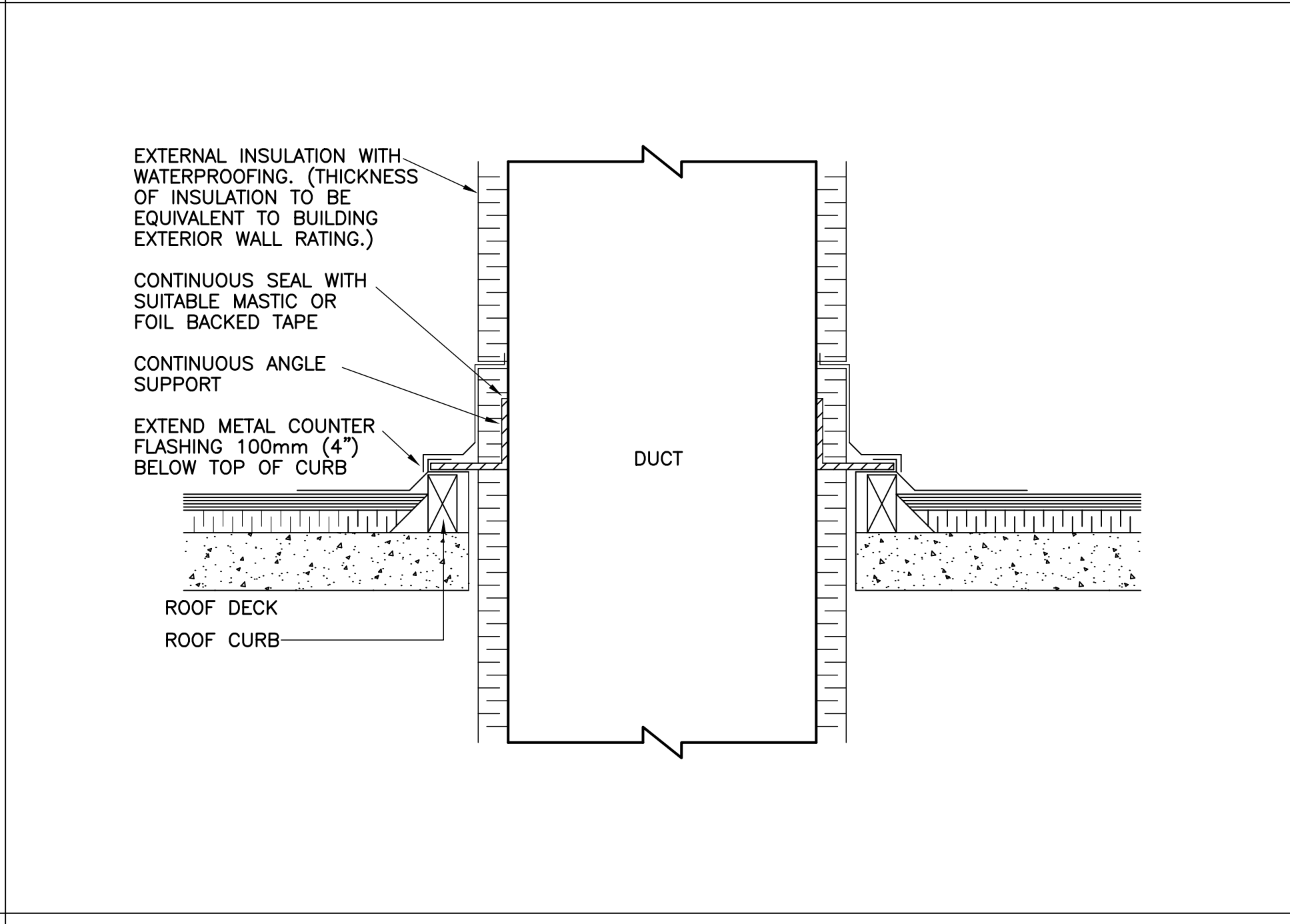
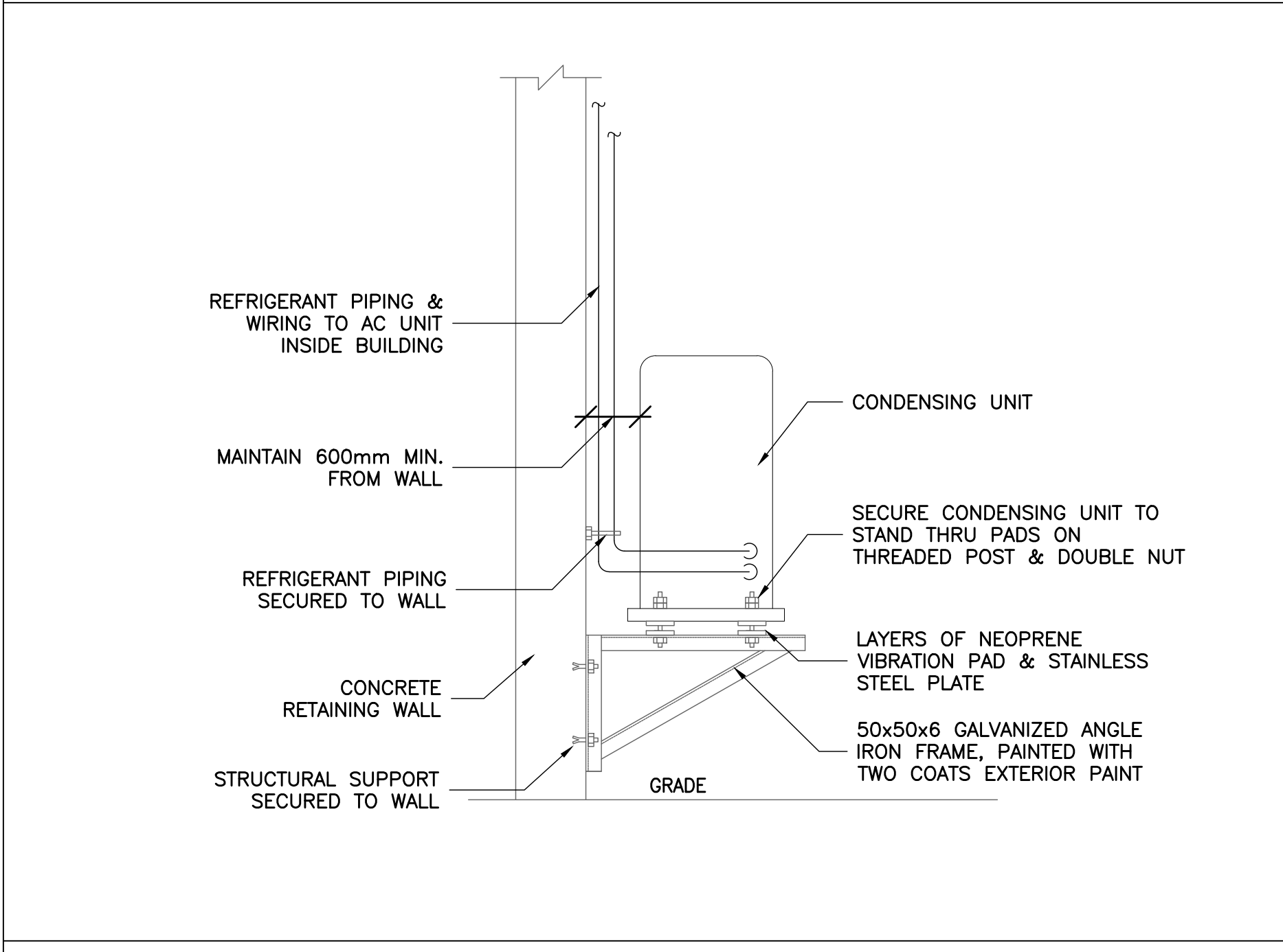
ROOF DUCT SUPPORT DETAIL  
N.T.S.



REFRIGERANT PIPING - ROOF SUPPORT DETAIL  
N.T.S.

PIPE SUPPORT DETAIL IN WALL  
N.T.S.

ROOF CURB DETAIL  
N.T.S.



CONDENSING UNIT ON WALL  
N.T.S.

H.V.A.C. DUCT THROUGH ROOF DETAIL  
N.T.S.

HUB OR FUNNEL DRAIN DETAIL  
N.T.S.

REVISIONS		
No.	ISSUE	DATE
A	ISSUED FOR COORDINATION	2026.03.18
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C	ISSUED FOR PERMIT	2026.04.21

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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**MECHANICAL DETAILS**

DRAWN BY: R.K. SCALE: N.T.S.

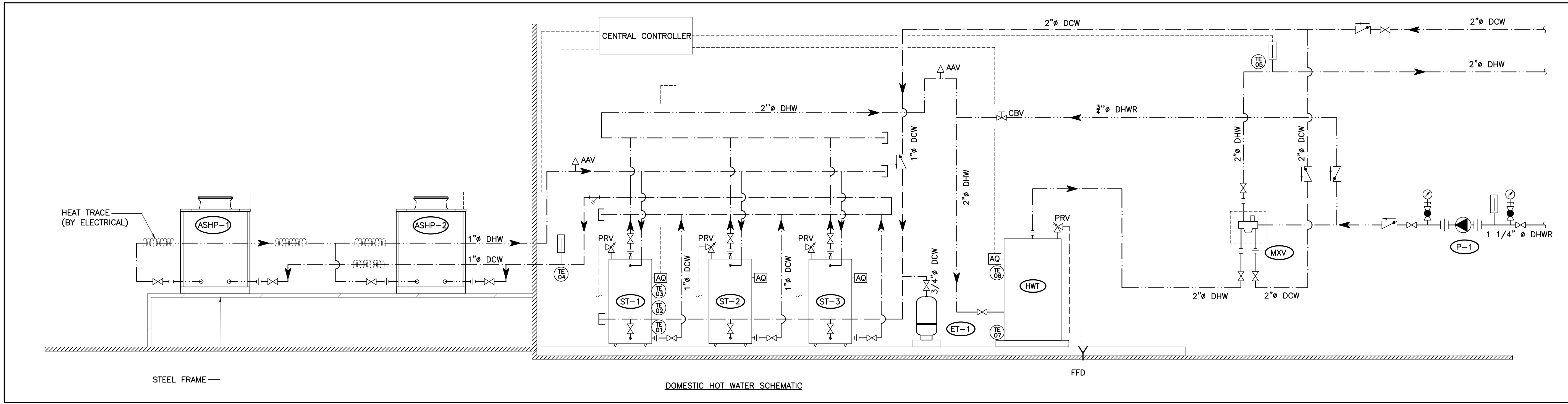
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PROJECT No.: **25037**

DRAWING No.: **M1.06**

EXHAUST FAN SCHEDULE											
TAG	LOCATION	MANUFACTURER	MODEL NO.	AIR QUANTITY (CFM)	STATIC PRESS. (IN WG)	ELECTRICAL			MOUNTING ARRANGEMENT	STARTER	REMARKS
						V/PH/HZ	HP	FLA			
EF-1	ROOFTOP	CANARM	9209	1100	1"	208/3/60	1/2	-	ROOF SLEEPERS	-	REFER TO NOTE BELOW
EF-2	ROOFTOP	CANARM	9210	2300	1"	208/3/60	1	-	ROOF SLEEPERS	-	REFER TO NOTE BELOW
EF-3	ROOFTOP	CANARM	309	750	1"	208/3/60	1/3	-	ROOF CURB	-	REFER TO NOTE BELOW
EF-4	ROOFTOP	CANARM	9210	2300	1"	208/3/60	1	-	ROOF SLEEPERS	-	REFER TO NOTE BELOW
EF-5	ROOFTOP	CANARM	9209	1850	1"	208/3/60	3/4	-	ROOF SLEEPERS	-	REFER TO NOTE BELOW
EF-6	ROOFTOP	CANARM	9209	1200	1"	208/3/60	1/2	-	ROOF SLEEPERS	-	REFER TO NOTE BELOW

NOTES:  
1. c/w BACKDRAFT DAMPER AND BIRD SCREEN.  
2. BLOWER MOUNTED ON HEAVY STEEL ANGLE WITH RUBBER ISOLATORS.  
3. CABINET INSULATED WITH 1/2" FIBERGLASS INSULATION.  
4. c/w MIN 18" ROOF CURB.(EF-3)  
5. ACCEPTABLE ALTERNATES: COOK, GREENHECK.



**SEQUENCE OF OPERATION**

- THIS SEQUENCE OUTLINES REQUIRED FUNCTIONALITY AND RECOMMENDED CONTROLS FOR A COMMERCIAL HEAT PUMP WATER HEATER SYSTEM IN A SINGLE PASS SWING TANK CONFIGURATION INCLUDING RESPONSE TO EXTERNAL LOAD SHIFT REQUESTS, BASIC ALARMS, AND EQUIPMENT TEMPERATURE SETPOINTS.
- EXECUTE THE SEQUENCE OF OPERATION IN REFERENCE TO "PRIMARY AND SWING TANK SETPOINTS" TABLE.
- PRIMARY WATER HEATER(S):
  - ENABLE FIRST ASHP WHEN "ON SENSOR" IS COOLER THAN "ON TEMPERATURE".
  - IF SECOND ASHP ENABLE WHEN "ON SENSOR" 2°F BELOW "ON TEMPERATURE" OR IF "ON SENSOR" REMAINS COOLER THAN "ON TEMPERATURE" AFTER 30 MINUTES, WHICHEVER HAPPENS FIRST.
    - ASHP WITH THE LOWEST ACCUMULATED RUN TIME SHALL BE CALLED TO RUN FIRST, EXCEPT BACK-UP HEATERS.
  - DISABLE ALL HEATERS WHEN "OFF SENSOR" IS WARMER THAN "OFF TEMPERATURE".
  - UPON CHANGE OF LOAD SHIFT OPERATION, DISABLE ALL HEATERS IF "ON SENSOR" IS WARMER THAN "ON TEMPERATURE".
- SWING TANK(S):
  - ENABLE SWING TANK HEATER WHEN SWING TANK TEMPERATURE IS COOLER THAN "SWING TANK SETPOINT" ("DEADBAND").
  - DISABLE SWING TANK HEATER WHEN SWING TANK TEMPERATURE IS WARMER THAN SWING TANK SETPOINT.
  - IF SWING TANK IS BEING USED FOR BACK-UP HEATING AND 1 OR MORE ASHP IS IN ALARM STATE, ENABLE SWING TANK USING TE-07 IN LOWER TANK. IF SWING TANK IS ONLY USED FOR TEMPERATURE MAINTENANCE HEATING, ENABLE SWING TANK USING TE-06 IN UPPER TANK.
- BACK-UP HEATER(S):
  - IF ONE OR MORE ASHP ARE IN A FAULT STATE, BACK-UP HEATERS SHALL BE ENABLED AS PRIMARY WATER HEATER(S). ALL OPERABLE ASHP SHALL ENABLE BEFORE BACK-UP HEATERS ARE ENABLED.

- BACK-UP WATER HEATER(S) MAY ALSO BE SET TO ENGAGE WHEN TE-03 DROPS BELOW 120°F AND TURN OFF WHEN TE-03 RISES ABOVE 130°F.
- MIXING VALVE SHALL MAINTAIN A SUPPLY WATER TEMPERATURE SETPOINT OF 125°F.
- HOT WATER CIRCULATION PUMP:
  - MAINTAIN THE MINIMUM FLOW REQUIRED BY THE MIXING VALVE MANUFACTURER AT ALL TIMES.
  - PROVIDE THE MINIMUM FLOW POSSIBLE THAT DELIVERS 115°F HOT WATER RETURN TEMPERATURE.
  - IF USING A VARIABLE SPEED PUMP, USE ONBOARD PUMP SPEED SETTINGS TO ACHIEVE FLOW CONTROL. THE FOLLOWING PUMP SETTINGS ARE RECOMMENDED ACCORDING TO THE DISTRIBUTION LOOP BALANCING METHOD:
    - DISTRIBUTION LOOPS WITH MULTIPLE BALANCED BRANCHES:
      - SET PUMP TO PROPORTIONAL PRESSURE IF SERVING THERMOSTATIC BALANCING VALVES.
      - SET PUMP TO CONSTANT TEMPERATURE IF SERVING PRESSURE INDEPENDENT BALANCING VALVES OR MANUAL BALANCING VALVES.
    - DISTRIBUTION LOOPS WITH SINGLE PIPE RUNS (WITHOUT MULTIPLE BRANCHES): SET PUMP TO CONSTANT TEMPERATURE.
  - IF USING A CONSTANT SPEED PUMP, INCLUDE BALANCING VALVE ON THE MAIN HOT WATER RETURN PIPE TO ACHIEVE FLOW CONTROL.
- THE ASHP SYSTEM ALARMS SHALL BE AUDIBLE, TEXT, OR EMAIL. AN ALARM HISTORY SHALL STORE LIST OF ALARMS THAT OCCURRED ON CONTROLLER UNTIL CLEARED BY USER. ALARMS SHALL BE INITIATED IN THE FOLLOWING CONDITIONS AT A MINIMUM:
  - ASHP EXPERIENCES A FAULT CONDITION.
  - BACKUP WATER HEATER(S) ARE ENGAGED.
  - MIXING VALVE OUTLET TEMPERATURE DROPS BELOW SETPOINT MINUS 5°F FOR MORE THAN 15 MINUTES.
- REMOTE COMMUNICATIONS: THE ASHP SYSTEM CONTROLLER SHALL BE PROVIDED REMOTE ACCESS TO:
  - UPDATE ASHP, BACK-UP, AND SWING TANK SETPOINTS AND SENSOR DESIGNATIONS IN "PRIMARY AND SWING TANK SETPOINTS" TABLE.
  - UPDATE LOAD SHIFT SCHEDULES.
  - SEND TREND DATA TO EXTERNAL SERVERS OR ONLINE DATABASE.
  - SEND ALARMS VIA EMAIL AND/OR TEXT MESSAGE. (OPTIONAL).

CONTROLS POINTS LIST	
TAG	LOCATION
TEMPERATURE SENSORS	
TE-01	ST-1 LOW (10-25% AQUASTAT FRACTION)
TE-02	ST-1 MID (30-45% AQUASTAT FRACTION)
TE-03	ST-1 HIGH (65-85% AQUASTAT FRACTION)
TE-04	ASHP INLET
TE-05	MXV OUTLET
TE-06	HWT-1 UPPER (65-85% AQUASTAT FRACTION)
TE-07	HWT-1 LOWER (20-45% AQUASTAT FRACTION)
ASHP INTERNAL POINTS	
ASHP INTERNAL FAULT	ASHP(S) (INTERNAL)
ASHP ENABLE/DISABLE	ASHP(S) (INTERNAL)
ASHP OUTLET TEMP SETPOINT	ASHP(S) (INTERNAL)

PRIMARY AND SWING TANK SETPOINTS						
LOAD SHIFT MODE	NORMAL OPERATION	SHED	CRITICAL PEAK EVENT	GRID EMERGENCY	LOAD UP	ADV. LOAD UP
PRIMARY WATER HEATER SETPOINTS						
OUTLET TEMPERATURE	150°F	150°F	150°F	DISABLED	150°F	180°F
ON SENOR	TE-02	TE-03	TE-03	DISABLED	TE-01	TE-01
ON TEMPERATURE	120°F	120°F	120°F	DISABLED	120°F	120°F
OFF SENOR	TE-01	TE-02	TE-02	DISABLED	TE-04 (ASHP INLET TEMP)	TE-04 (ASHP INLET TEMP)
OFF TEMPERATURE	140°F	140°F	140°F	DISABLED	125°F	125°F
SWING TANK SETPOINTS						
SETPOINT (DEADBAND)	130°F (5°F)	130°F (5°F)	DISABLED	DISABLED	130°F (5°F)	130°F (5°F)

- NOTES:  
1. ASHP INLET TEMPERATURE MAY COME INTERNAL TO THE ASHP.  
2. AQUASTAT FRACTION = STORAGE VOLUME BELOW/UPSTREAM OF THE TEMPERATURE SENSOR DIVIDED BY TOTAL STORAGE VOLUME.  
3. ASHP MANUFACTURER SHALL PROVIDE INSTRUCTIONS TO THE CONTROLS CONTRACTOR -THROUGH A SUBMITTAL OR INSTALLATION MANUAL - DETAILING WIRING BETWEEN HEATING EQUIPMENT, EXTERNAL CONTROLLER, AND CONTROL SENSORS  
4. TE-07 IS REQUIRED ONLY IF SWING TANK IS BEING USED FOR BACK-UP HEATING.

REVISIONS		
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C	ISSUED FOR PERMIT	2026.04.21



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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**MECHANICAL  
SCHEDULES &  
SCHEMATIC**

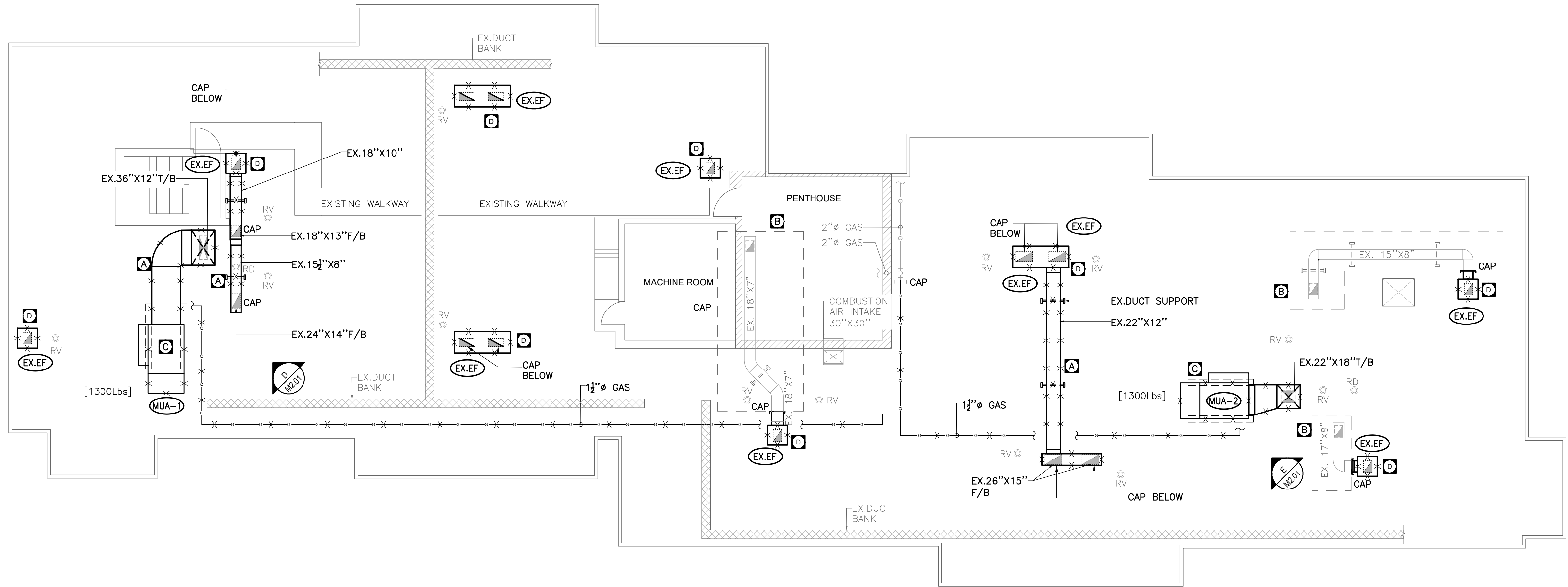
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CHECKED BY: D.H. DATE:

PROJECT No.: **25037**

DRAWING No.: **M1.05**

REVISIONS		
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A	ISSUED FOR COORDINATION	2026.03.18
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C	ISSUED FOR PERMIT	2026.04.21



1 HVAC ROOF PLAN - DEMOLITION  
M2.01

DEMOLISH EXISTING GAS FIRED MUA c/w ALL ASSOCIATED ACCESSORIES, CAP GAS LINE AT MAIN.

DEMOLISH EX. EXHAUST DUCT AND CAP AT RISER. EX. DUCT CURB AND FLASHING TO REMAIN.

DEMOLISH EXISTING GAS PIPING AND CAP GAS LINE AT MAIN AS INDICATED ON DRAWINGS.



1 VIEW-D  
M2.01



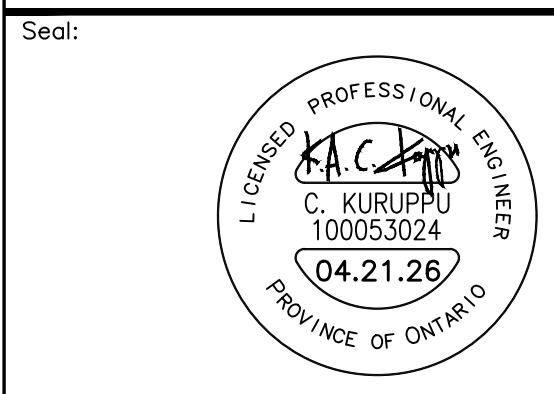
1 VIEW-E  
M2.01

DEMOLITION DRAWING NOTES:

- A DEMOLISH EXISTING EXHAUST DUCTWORK ON ROOF LEVEL c/w DUCT SUPPORTS. TEMPORARILY CAP AND SEAL DUCT AT THE RISER, EXISTING DUCT CURB AND ROOF FLASHING TO REMAIN. (TYP.) CONTRACTOR TO FIELD VERIFY EXISTING SIZES OF DUCT RISERS AND ADVISE CONSULTANTS ON FINDINGS. (TYP.)
- B ALL EXISTING DUCTWORK WITHIN THE MARKED AREA TO REMAIN.
- C DEMOLISH EXISTING GAS FIRED MUA c/w ALL ASSOCIATED ACCESSORIES, CAP GAS LINE AT MAIN. CAP SUPPLY AIR DUCT AT THE MAIN RISER, EXISTING SUPPLY AIR DUCT CURB AND ROOF FLASHING TO REMAIN. CLEAN EXISTING DUST RISERS c/w ASSOCIATED GRILLES.
- D DEMOLISH EXISTING EXHAUST FAN c/w ALL ASSOCIATED ACCESSORIES. TEMPORARILY CAP EXISTING EXHAUST DUCT RISER DIRECTLY BELOW THE EXISTING FAN AND CAP EXISTING ROOF EXHAUST DUCT AS SHOWN. CLEAN ALL EXISTING DUCT RISERS c/w ASSOCIATED GRILLES PRIOR TO CONNECTION TO NEW EQUIPMENT.(TYP.)

GENERAL NOTES:

1. THE EXISTING SERVICES SHOWN ON THIS DRAWING HAVE BEEN TAKEN FROM SITE MEASUREMENTS. THIS INFORMATION MUST NOT ASSUMED TO BE COMPLETE OR UP-TO-DATE. THIS MECHANICAL CONTRACTOR SHALL CARRYOUT A FULL SURVEY OF ALL EXISTING SERVICES AND STRUCTURE TO CONFIRM THE SIZE AND LOCATION OF THESE SERVICES, BEFORE THE COMMENCEMENT OF ANY WORK.
2. CONTRACTOR TO INCLUDE IN PRICING TO CLEAN ALL EXISTING EXHAUST DUCTS(RISERS AND BRANCH DUCTS) AND 2x EXISTING MAKE-UP AIR SUPPLY DUST RISERS.



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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**HVAC ROOF  
PLAN - DEMOLITION**

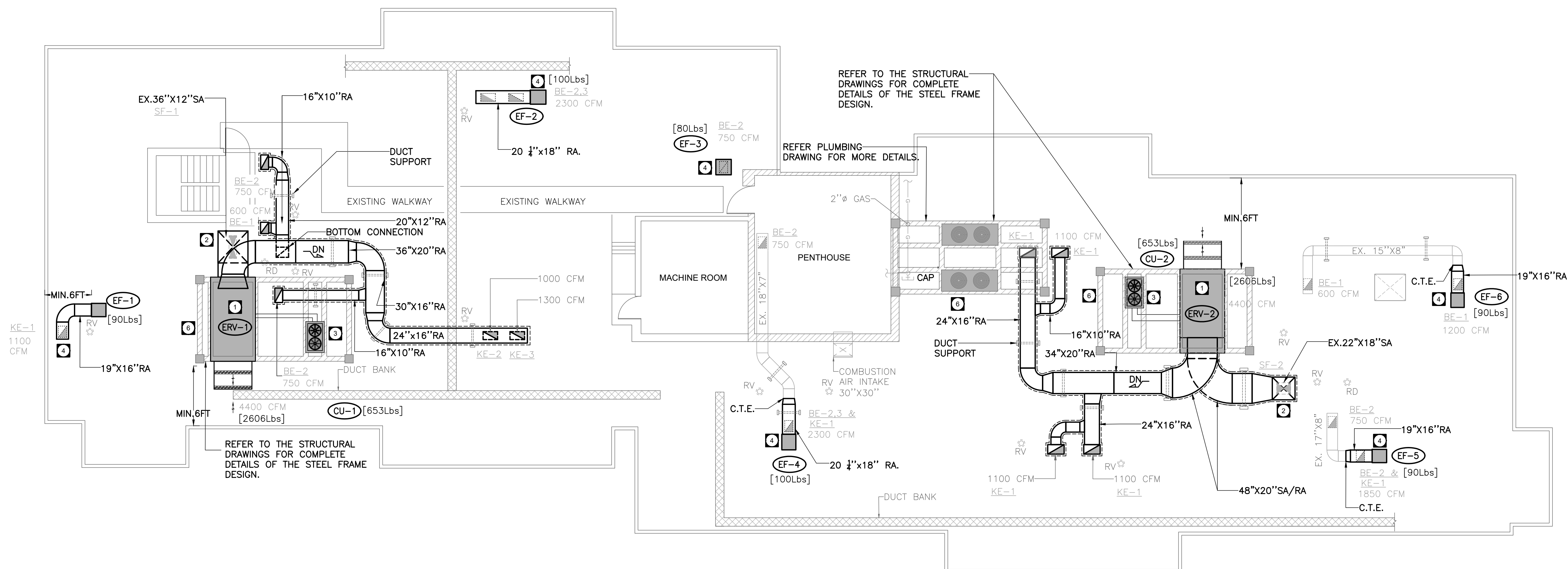
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DRAWING No.: **M2.01**

REVISIONS		
No.	ISSUE	DATE
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B	ISSUED FOR TENDER	2026.04.16
C	ISSUED FOR PERMIT	2026.04.21



1 HVAC ROOF PLAN – NEW  
M3.01

**GENERAL NOTES:**

- INSULATE ALL SUPPLY & EXHAUST DUCTWORK FROM ERV UNITS WITH A MINIMUM OF 75MM INSULATION.
- ALL EXPOSED LOW VOLTAGE WIRING TO BE WITHIN EMT CONDUIT PROVIDED BY THIS DIVISION.
- ALL MOTORIZED DAMPER ACTUATORS TO BE SUPPLIED WITH LOW VOLTAGE TRANSFORMERS c/w BOX BY THIS DIVISION. LINE VOLTAGE SIDE BY DIVISION 16.
- ALL MECHANICAL ROOF PENETRATIONS (PIPES AND DUCTS) SHALL BE SEALED TO BE AIR-TIGHT, EXCLUDING THOSE WITH FIRE DAMPERS.

**DRAWING NOTES:**

- NEW ENERGY RECOVERY VENTILATOR MOUNTED ON STEEL FRAME (BY STRUCTURAL). INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS. REFER TO MECHANICAL DWG M1.03 FOR ERV UNIT SCHEDULES. CONNECT REFRIGERANT PIPING TO LEV KIT FROM CONDENSING UNIT PER MANUFACTURER'S WRITTEN INSTRUCTIONS. MAINTAIN MIN. 3.0m CLEARANCE BETWEEN AIR INTAKE AND ANY EXISTING PLUMBING VENTS. (TYP.).
- EXTEND AND CONNECT NEW SUPPLY AIR DUCT TO EXISTING SUPPLY AIR DUCT RISER. PROVIDE NEW DUCT CURB, ROOF SUPPORTS, FLASHING AS REQUIRED. PROVIDE MIN. 75mm INSULATION c/w POLYGUARD FLEXIBLE WEATHER PROOFING JACKETING. PROVIDE 25mm ACOUSTIC LINING.
- CONDENSING UNIT MOUNTED ON STEEL FRAME (BY STRUCTURAL) EXTEND INSULATED REFRIGERANT PIPING TO ERV UNIT COIL. (TYP.)
- PROVIDE NEW ROOF MOUNTED EXHAUST FAN c/w ALL REQUIRED ACCESSORIES. EXTEND EXISTING DUCTWORK FROM RISERS AND CONNECT TO NEW EXHAUST FANS AS SHOWN.(TYP.)
- PROVIDE NEW DUCT CURBS c/w FLASHING FOR EXISTING EXHAUST DUCT RISER LOCATIONS AND EXTEND DUCTWORK AS SHOWN w/ ROOF DUCT SUPPORTS. PROVIDE MIN.75mm INSULATION c/w POLYGUARD FLEXIBLE WEATHER PROOFING JACKETING. PROVIDE NEW BALANCING DAMPER AT TOP OF EACH RISER IN 9TH FLOOR CEILING LEVEL AND BALANCE TO AIRFLOW RATES SHOWN. PROVIDE RATED ACCESS PANELS WHERE REQUIRED FOR MAINTENANCE/ACCESS OF DAMPERS. (TYP.)
- COORDINATE STEEL FRAME INSTALLATION WITH EXHAUST DUCTWORK TO AVOID CONFLICTS



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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

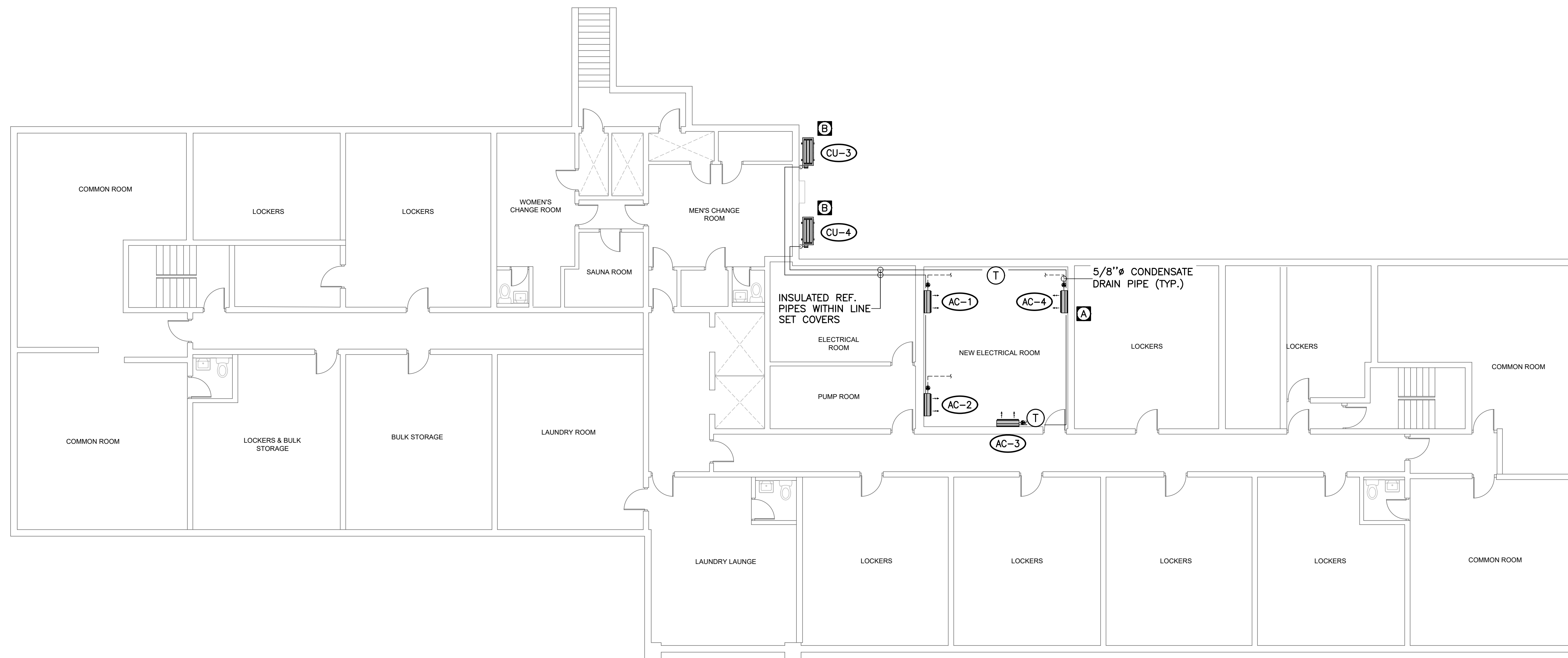
DRAWING TITLE:  
**HVAC ROOF  
PLAN - NEW**

DRAWN BY: R.K. SCALE: 1/8" = 1' 0"

CHECKED BY: D.H. DATE:

PROJECT No.: **25037**

DRAWING No.: **M3.01**



1 HVAC BASEMENT PLAN – NEW  
M3.02

**GENERAL NOTES:**

1. THERMOSTATS LOCATIONS ARE SHOWN FOR PRICING ONLY. CO-ORDINATE FINAL LOCATION WITH ARCHITECT/OWNER. THERMOSTATS MOUNTING HEIGHT SHALL BE BETWEEN 1400 AND 1500MM AAF AND 1200MM MAXIMUM FOR ACCESSABLE UNITS AND ACCESSABLE ROUTES.
2. ALL EXPOSED LOW VOLTAGE WIRING TO BE WITHIN EMT CONDUIT PROVIDED BY THIS DIVISION.
3. ALL MECHANICAL PENETRATIONS (PIPES, DUCTS) THROUGH SUITE WALLS AND BUILDING ENVELOPE (BASEMENT FLOORS, WALLS, ROOF DECK, ETC) SHALL BE AIR TIGHT SEALED, EXCLUDING FIRE DAMPERS.

**DRAWING NOTES:**

- PROVIDE WALL-MOUNTED INDOOR AC UNIT AT HIGH LEVEL. RUN INSULATED REFRIGERANT PIPING, CONTROL WIRING, AND CONDENSATE DRAIN WITHIN LINE SET COVERS. CONTRACTOR TO FIELD VERIFY AND TERMINATE CONDENSATE DRAIN PIPE AT NEAREST HUB DRAIN c/w AN AIR GAP. INSULATE CONDENSATE DRAIN PIPING PER SPECS.
- CONDENSING UNIT MOUNTED ON EXTERIOR WALL (AT HIGH LEVEL, MIN 24" ABOVE GRADE) c/w WALL BRACKETS. (TYP.)

REVISIONS		
No.	ISSUE	DATE
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PROJECT:  
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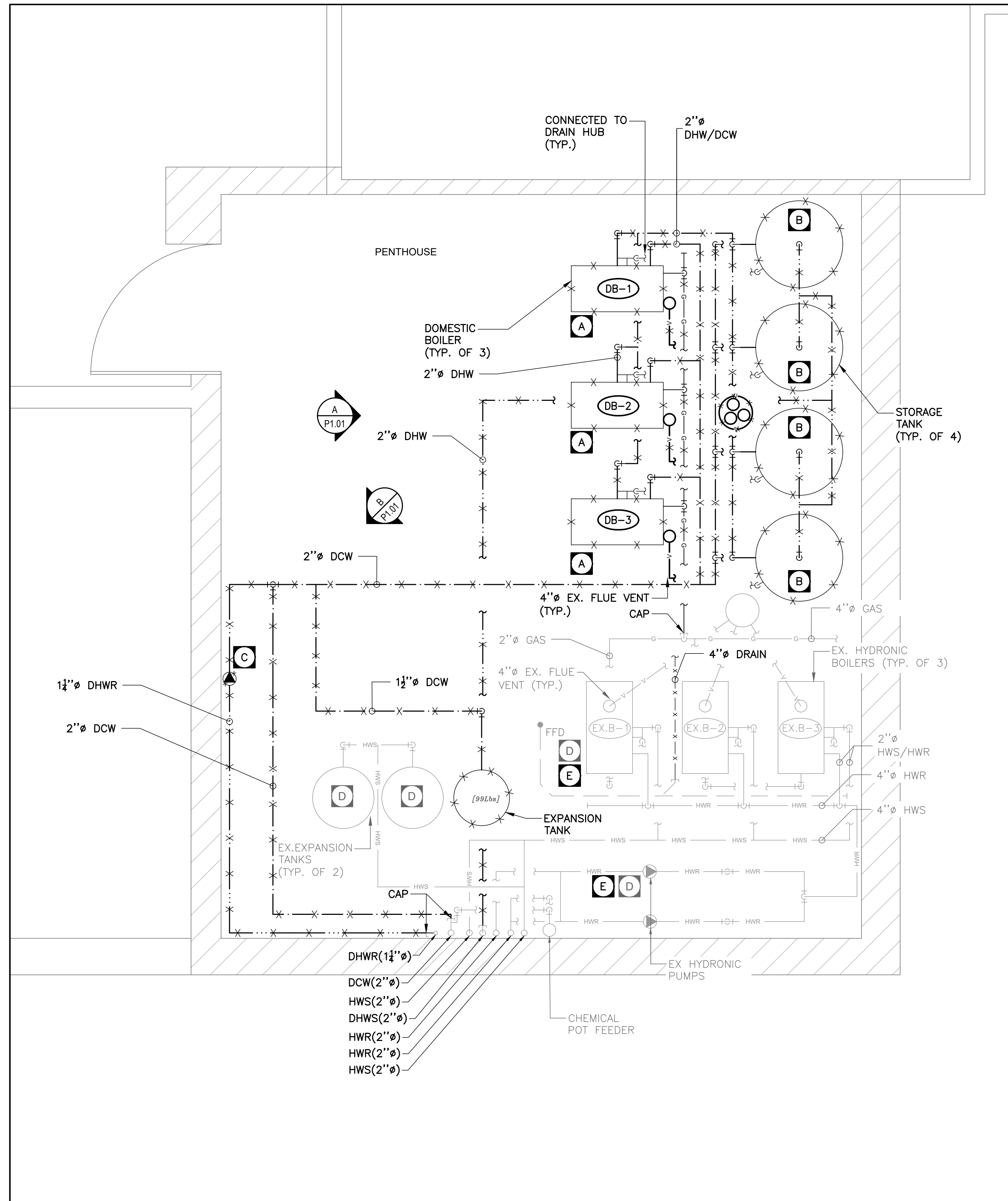
DRAWING TITLE:  
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 BASEMENT PLAN - NEW**

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PROJECT No.: **25037**

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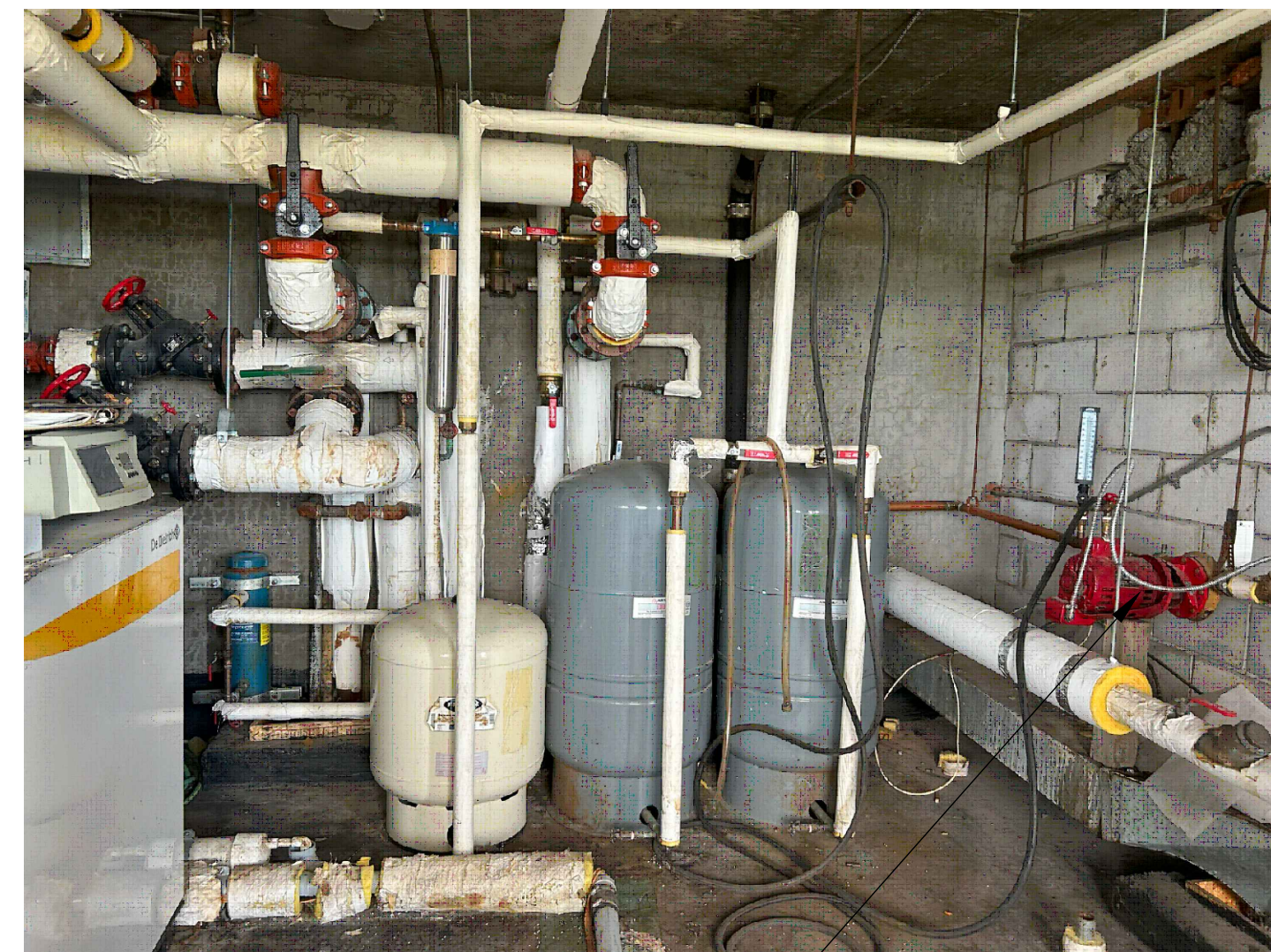


1 MECHANICAL PENTHOUSE  
P1.01



DEMOLISH & REMOVE ALL EXISTING DOMESTIC HOT WATER BOILERS (TYP. OF 3)

2 VIEW-A  
P1.01

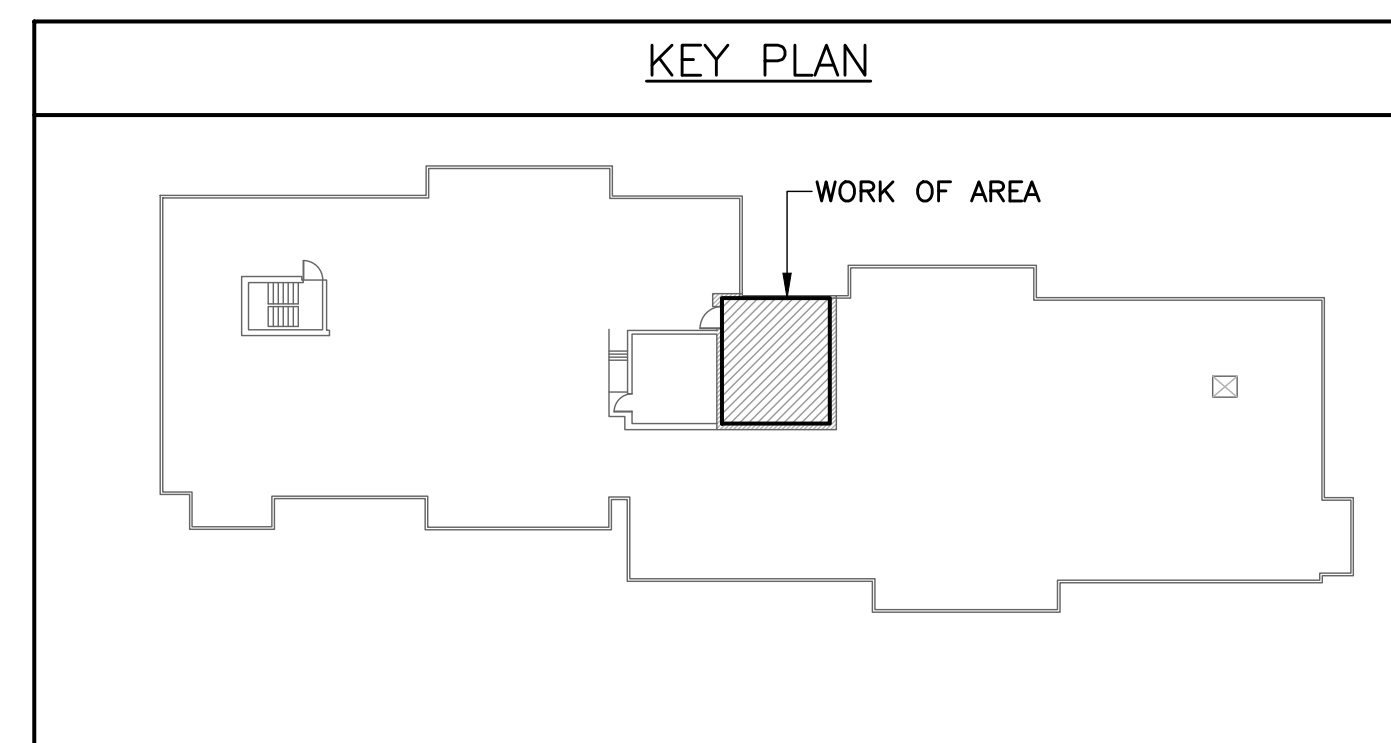


DEMOLISH RECIRCULATING PUMP C/W ASSOCIATED PIPING AND CAP MAIN LINE.

3 VIEW-B  
P1.01

**PLUMBING DEMOLITION NOTES:**

- A** DEMOLISH EXISTING GAS FIRED DOMESTIC HOT WATER HEATING BOILERS (QTY.3) c/w ASSOCIATED FLUE VENTS, HOT/COLD WATER PIPING, GAS PIPING, CONTROLS AND ALL ASSOCIATED ACCESSORIES. CAP PIPING AT MAINS. PATCH EXISTING ROOF OPENING SERVING EXISTING BOILER VENTS. (TYP.)
- B** DEMOLISH EXISTING DOMESTIC HOT WATER STORAGE TANKS (QTY.4) c/w ALL ASSOCIATED ACCESSORIES. CAP PIPING AT MAINS. HAND OVER THE EXISTING TANKS TO THE OWNER.
- C** DEMOLISH EXISTING DOMESTIC HOT WATER RECIRCULATING PUMP c/w ALL ASSOCIATED ACCESSORIES.
- D** EXISTING HYDRONIC SYSTEM c/w ALL ASSOCIATED ACCESSORIES AND CONTROLS TO REMAIN, INCLUDING GAS FIRED BOILERS (QTY.3), HYDRONIC PUMPS (QTY.2), EXPANSION TANKS ETC.
- E** REMOVE EXISTING INSULATION OF BOTH DOMESTIC AND HYDRONIC PIPING WITHIN THE PENTHOUSE MECHANICAL ROOM AND PROVIDE NEW.



**GENERAL DEMOLITION NOTES:**

1. THE EXISTING SERVICES SHOWN ON THIS DRAWING HAVE BEEN TAKEN FROM SITE MEASUREMENTS. THIS INFORMATION MUST NOT ASSUMED TO BE COMPLETE OR UP-TO-DATE. THIS MECHANICAL CONTRACTOR SHALL CARRYOUT A FULL SURVEY OF ALL EXISTING SERVICES AND STRUCTURE TO CONFIRM THE SIZE AND LOCATION OF THESE SERVICES, BEFORE THE COMMENCEMENT OF ANY WORK.
2. THIS CONTRACTOR MUST FIELD VERIFY EXTENT OF DEMOLITION WORK PRIOR TO BID. ALL ITEMS BEYOND DEMOLITION AREA TO BE MAINTAINED. FIELD VERIFY ALL EXISTING, ALLOW FOR ANY REPAIR MODIFICATIONS, EXTENSIONS ETC. THAT MAY BE REQUIRED DUE TO DAMAGE IN EXISTING DURING RENOVATION WORK. DISPOSE OFF ALL REMOVED ITEMS AS DIRECTED BY OWNER.
3. ALL ITEMS NOT BEING RE-USED TO BE REMOVED. DEMOLITION CONTRACTOR TO REVIEW PLANS AND SCHEDULES FOR NEW WORK AND EXISTING TO REMAIN FOR RE-USE.
4. DEMOLITION CONTRACTOR TO ENSURE THAT ALL MATERIALS AND FIXTURES NOT BEING SALVAGED TO BE DISPOSED OF IN A LEGAL MANNER.
5. ALL EXISTING UNUSED PLUMBING PIPING TO BE DISCONNECTED, REMOVED AND CAPPED AT MAIN OR BELOW FLOOR LEVEL. MAKE FLOOR AND WALLS GOOD WHERE NECESSARY.
6. PATCH FIRE RATED PARTITIONS AND FLOORS TO MAINTAIN RATING UPON REMOVAL OF MECHANICAL SERVICES ORIGINALLY SPANNING FIRE RATED ASSEMBLIES.
7. REPAIR ANY DAMAGE CAUSED BY THIS WORK AND MAKE GOOD TO MATCH EXISTING.
8. REMOVE ALL DEBRIS AND CLEAN FROM SITE DAILY.
9. CONFIRM WITH THE OWNER CONCERNING SCHEDULE, DUST AND NOISE CONTROL PRIOR TO COMMENCING WORK IN OR ADJACENT TO EXISTING FACILITIES WHERE SUCH WORK MIGHT AFFECT EITHER THOSE FACILITIES OR THEIR OCCUPANTS.
10. EXECUTE WORK WITH LEAST POSSIBLE INTERFERENCE OR DISTURBANCE TO OCCUPANTS, PUBLIC AND NORMAL USE OF PREMISES.
11. PROVIDE TEMPORARY MEANS TO MAINTAIN SECURITY WHEN SECURITY HAS BEEN REDUCED.
12. PROVIDE TEMPORARY DUST SCREENS, BARRIERS, WARNING SIGNS IN LOCATIONS WHERE RENOVATIONS AND ALTERNATION WORK IS ADJACENT TO AREAS WHICH WILL BE OPERATIVE DURING WORK.
13. SHOULD ANY MECHANICAL OR ELECTRICAL SERVICE LINE BE BROKEN, OR DISRUPTED BY OPERATIONS SPECIFIED UNDER THIS CONTRACT, REPAIR SERVICE LINES, AND MAKE GOOD ALL DAMAGE DUE TO THE DISRUPTION OR BREAK, AT NO EXPENSE TO THE OWNER. NOTIFY THE OWNER IMMEDIATELY WHENEVER ANY SERVICE LINE IS BROKEN OR DAMAGED.
14. ACCEPT LIABILITY FOR COSTS INCURRED BY THE OWNER IN REPAIRING AND CLEANING EQUIPMENT, ETC., RESULTING FROM FAILURE TO COMPLY WITH THE ABOVE REQUIREMENTS.
15. USE ONLY THOSE EXISTING ENTRANCES AND STAIRS DESIGNATED BY THE OWNER FOR ACCESS TO AND EGRESS FROM THE EXISTING BUILDINGS AND VARIOUS FLOORS WHERE WORK OF THIS CONTRACT IS TO BE CARRIED OUT. NO TRAFFIC THROUGH OTHER AREAS OF THE BUILDING WILL BE PERMITTED WITHOUT THE PRIOR CONSENT OF THE OWNER.
16. KEEP STAIRS AND CORRIDORS CLEAR AND OPEN AS REQUIRED BY FIRE MARSHALL FOR EXIT PURPOSES IN CASE OF FIRE, AND AS REQUIRED FOR USE BY THE OWNER'S PERSONNEL.
17. ARRANGE AND PAY FOR THE DISCONNECTION, CAPPING AND FOR PLUGGING OF GAS, WATER, SEWER, STORM AND OTHER SERVICES TO THE BUILDING TO BE DEMOLISHED. IN EACH CASE THE UTILITY COMPANY INVOLVED SHALL BE NOTIFIED IN ADVANCE AND ITS APPROVAL OBTAINED BEFORE COMMENCING THAT PORTION OF THE WORK. DISCONNECT AND CAP SERVICES AT THE LOCATIONS INDICATED BY THE CONSULTANT.
18. ARRANGE, SCHEDULE AND PERFORM WORK WITH MINIMUM DISTURBANCE TO EXISTING FACILITIES AND SERVICES.
19. SUBMIT A COMPLETE SCHEDULE OF SERVICE INTERRUPTIONS AND CHANGEOVERS WITH APPROXIMATE DATES, REQUIRED DURATIONS AND TIMES OF DAY, FOR APPROVAL BEFORE PROCEEDING.
20. NOTIFY OWNER IN WRITING AT LEAST 72 HOURS IN ADVANCE OF PLANNED INTERRUPTION TO EXISTING SERVICES.
21. INTERRUPTION OF SERVICE MUST OCCUR AT THE TIMES AND FOR THE DURATION STIPULATED BY THE OWNER.
22. KEEP SERVICE INTERRUPTION DURATION TO AN ABSOLUTE MINIMUM. CARRY OUT ALL PREPARATORY WORK, MEASUREMENTS, ETC., WITHOUT INTERRUPTION OF EXISTING SERVICES.
23. IF SERVICE INTERRUPTIONS ARE REQUIRED BY THE OWNER DURING THE NIGHT OR ON WEEKENDS, ETC., PREMIUM TIME SHALL BE INCLUDED AT THE CONTRACT PRICE. NO EXTRA CHARGES WILL BE ALLOWED AT A LATER DATE FOR FAILURE TO INCLUDE SAME.

**REVISIONS**

No.	ISSUE	DATE
A	ISSUED FOR COORDINATION	2026.03.18
B	ISSUED FOR TENDER	2026.04.16
C	ISSUED FOR PERMIT	2026.04.21

Seal:

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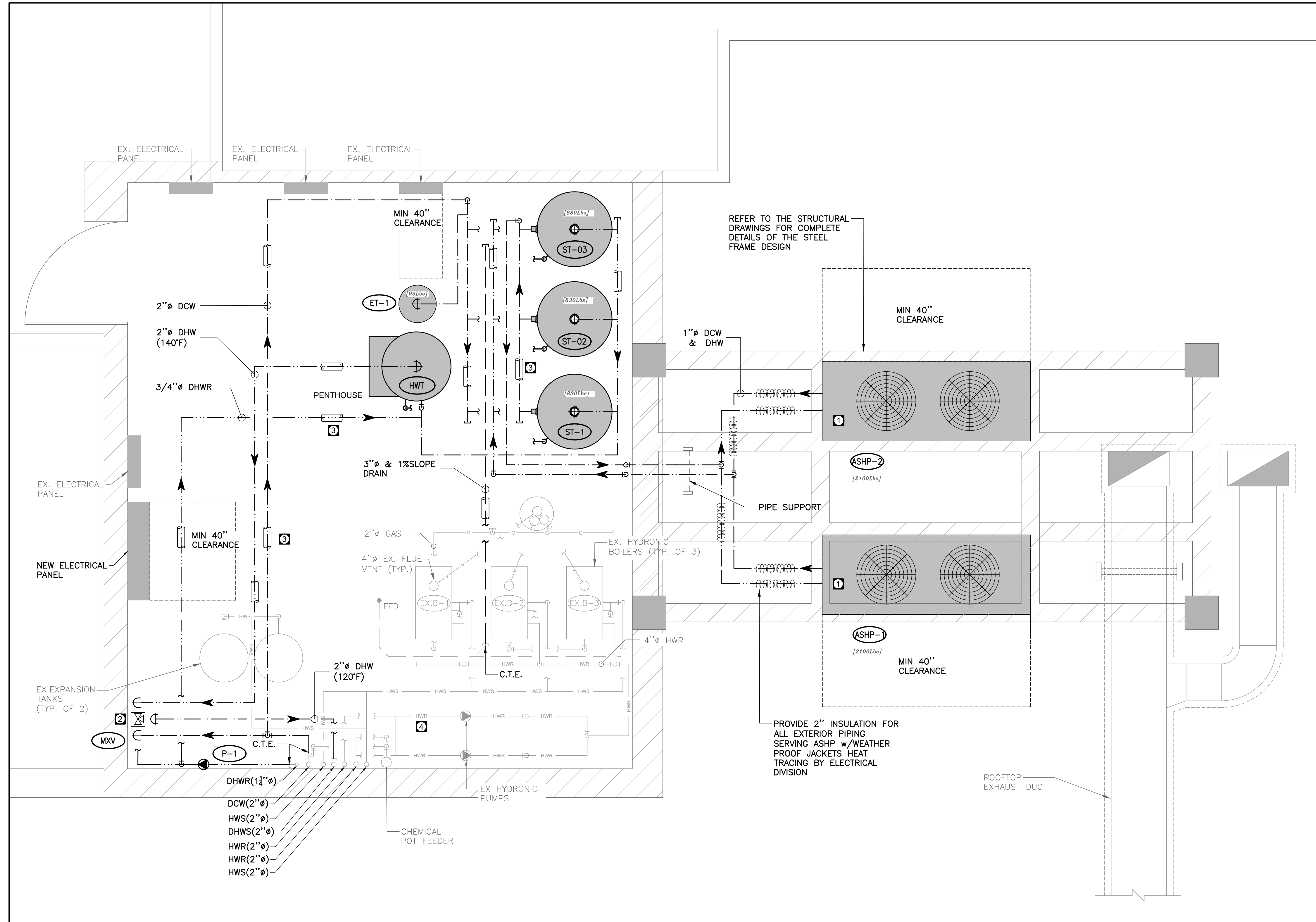
PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**PLUMBING ROOF  
PLAN - DEMOLITION**

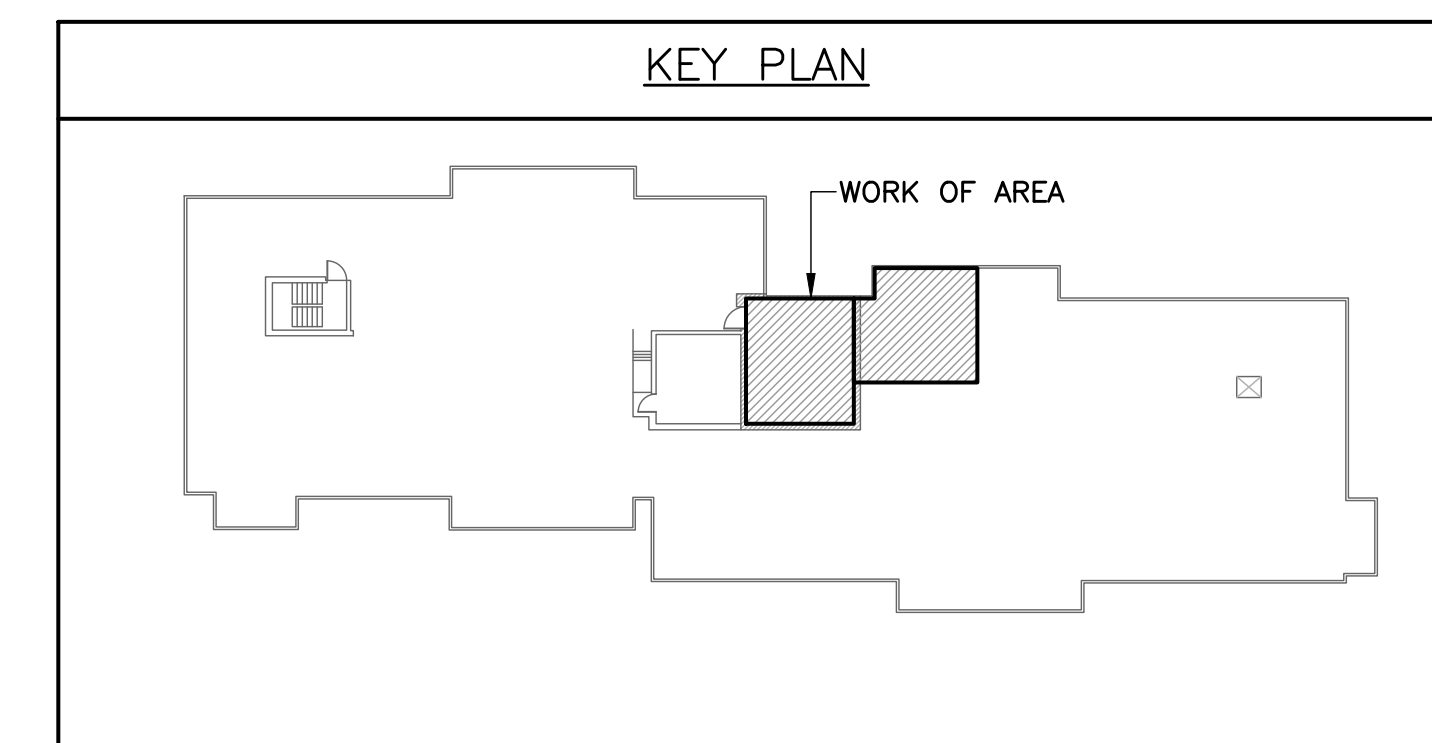
DRAWN BY: R.K.	SCALE: 1/2" = 1'0"
CHECKED BY: D.H.	DATE:

PROJECT No.:  
**25037**

DRAWING No.:  
**P1.01**



1 MECHANICAL PENTHOUSE  
P2.01



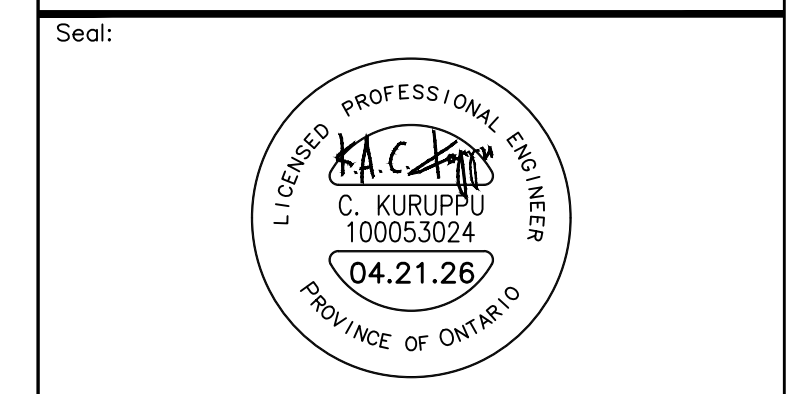
**GENERAL NOTES:**

- A. ALL PLUMBING WORK TO CONFORM TO ONTARIO BUILDING CODE, PROVIDE COMPLETE VENT SYSTEM TO MEET SECTION 7 OF ONTARIO BUILDING CODE.
- B. IPEX SYSTEM XFR 15-50 PIPE AND FITTINGS C/W APPROVED FIRE STOPS IN AREA WHERE THE CEILING SPACE IS UTILIZED AS RETURN AIR PLENUM.
- C. DOMESTIC HOT AND COLD WATER PIPING SHALL BE TYPE "L" HARD COPPER TUBING WITH SOLDERED FITTINGS OR IPEX AQUARISE CPVC PIPE AND FITTINGS CERTIFIED TO CSA-B137.6
- D. COORDINATE PIPE INSTALLATION WITH SHEET METAL CONTRACTOR.
- E. CONTRACTOR TO FIELD VERIFY WORK SITE CONDITIONS.
- F. COORDINATE PIPES WITH DUCTS, ELECTRICAL AND STRUCTURAL, OFFSET IF REQUIRED.
- G. INSULATE ALL NEW DOMESTIC HOT/COLD/HOT WATER RETURN WATER PIPES WITH MINIMUM 12MM THICK INSULATION EXCEPT PIPING PERIMETER WALL WHICH REQUIRES 25MM COVER EXPOSED PIPES WITH PVC JACKETS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING LAYOUT.
- H. ALL RUNNING TRAPS TO BE COMPLETE WITH TRAP SEAL PRIMER CONNECTION AND MIFAB MI-GARD.

**PLUMBING DRAWING NOTES:**

- 1 NEW AIR SOURCE HEAT PUMP MOUNTED ON STEEL FRAME (BY STRUCTURAL). ALL EXPOSED PIPING SERVING THE UNIT TO BE HEAT TRACED (BY ELECTRICAL DIVISION) AND INSULATED w/ WEATHER PROOFING JACKETS (BY THIS DIVISION). MAINTAIN REQUIRED CLEARANCES AND INSTALL PER MANUFACTURER'S WRITTEN INSTRUCTIONS. (TYP. OF 2)
- 2 NEW WALL MOUNTED DOMESTIC HOT WATER MIXING VALVE c/w SS CABINET.
- 3 PROVIDE INSULATION FOR BOTH EXISTING AND NEW DOMESTIC PIPING WITHIN THE BOILER ROOM PER SPECIFICATIONS. CLEARLY LABEL AND IDENTIFY ALL PIPING.
- 4 PROVIDE INSULATION FOR ALL EXISTING HYDRONIC PIPING WITHIN THE BOILER ROOM. CLEARLY IDENTIFY ALL PIPING.

REVISIONS		
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PROJECT:  
**1 HAMILTON STREET  
SOUTH, WATERDOWN  
SERVICE UPGRADE**

DRAWING TITLE:  
**PLUMBING  
ROOF PLAN - NEW**

DRAWN BY: R.K. SCALE: 1/2" = 1'0"

CHECKED BY: D.H. DATE:

PROJECT No.: **25037**

DRAWING No.: **P2.01**