

FRONT OF YONGE PUBLIC SCHOOL - ARCHITECTURAL SERVICES

1504 COUNTY RD. 2 - FRONT OF YONGE TOWNSHIP - ONTARIO

MECHANICAL



Client

DRAWING LIST

SYMBOL	DESCRIPTION
M1	MECHANICAL TITLE PAGE
M2	MECHANICAL SPECIFICATIONS & RTU CONTROLS
M3	DETAILS & SCHEDULES
M4	MECHANICAL DEMOLITION – GROUND FLOOR
M5	MECHANICAL NEW WORK – GROUND FLOOR
M6	MECHANICAL DEMOLITION – ROOF
M7	MECHANICAL NEW WORK – ROOF

GENERAL LEGEND

SYMBOL	DESCRIPTION
————	EXISTING PIPING/DUCTWORK/EQUIPMENT
-----	EXISTING PIPING/DUCTWORK/EQUIPMENT TO BE REMOVED/RELOCATED
————	NEW/RELOCATED PIPING/DUCTWORK/EQUIPMENT
(E)	DENOTES EXISTING EQUIPMENT
(R)	DENOTES RELOCATED EQUIPMENT
(N)	DENOTES NEW EQUIPMENT
(X)	DENOTES EQUIPMENT TO BE REMOVED

PLUMBING LEGEND

SYMBOL	DESCRIPTION
—COW—	DOMESTIC COLD WATER PIPING
—CHW—	DOMESTIC HOT WATER PIPING
—SAN—	SANITARY PIPING
—ST—	STORM PIPING
RD1	ROOF DRAIN (TYPE)
—>—	PIPING OFFSET
—>—	BRANCH PIPING DOWN
—>—	PIPING DOWN
—>—	PIPING UP
—>—	PIPE BREAK
—>—	CAP
—>—	ISOLATION VALVES

HVAC LEGEND

SYMBOL	DESCRIPTION
—>—	RECTANGULAR DUCTWORK
—>—	ROUND DUCTWORK
—>—	ROUND DUCTWORK OFFSET
—>—	RECTANGULAR DUCTWORK OFFSET
—>—	DUCTWORK UP
—>—	DUCTWORK DOWN
—>—	ECCENTRIC TRANSITION
—>—	RECTANGULAR TAKE-OFF C/W BALANCING DAMPER
—>—	RECTANGULAR TAKE-OFF
—>—	TAKE-OFF C/W BALANCING DAMPER
—>—	SQUARE SUPPLY DIFFUSER (TYPE)
—>—	EXHAUST GRILLE (EG)
—>—	WALL GRILLE (TYPE)
—>—	BALANCING DAMPER (BD)
—>—	BACK DRIFT DAMPER (BDD)
—>—	SUPPLY AIR
—>—	EXHAUST AIR
—>—	RETURN AIR
—>—	OUTDOOR AIR
—>—	ROOF EXHAUST FAN (EF)
—>—	GRILLE TAG
—>—	GRILLE TYPE
—>—	AIRFLOW (L/S)
—>—	DIMENSIONS (mm)

GENERAL NOTES:

1. ALL WORK SHOWN OR IMPLIED ON THESE DRAWINGS SHALL BE CARRIED OUT IN ACCORDANCE WITH:
A. ALL CODES AND LAWS APPLICABLE (OBC)
B. INSTRUCTIONS TO BIDDERS
C. IN ACCORDANCE WITH SMACNA—LATEST EDITION (DUCTWORK)
D. IN ACCORDANCE WITH ULC STANDARDS
2. PRIOR TO SUBMITTING TENDERS, EACH TRADE SHALL EXAMINE THE SITE TO DETERMINE THE CONDITIONS WHICH MAY AFFECT THE PROPOSED WORK. NO CLAIM FOR EXTRA PAYMENT WILL BE CONSIDERED BECAUSE OF FAILURE TO FULFILL THIS CONDITION. START OF WORK WILL BE DEEMED EVIDENCE OF ACCEPTANCE OF, AND SATISFACTION WITH, EXISTING CONDITIONS.
3. THE DRAWINGS SHALL BE CONSIDERED TO SHOW THE GENERAL CHARACTER AND SCOPE OF THE WORK AND NOT THE EXACT DETAILS OF THE INSTALLATION. THE INSTALLATION SHALL BE COMPLETE WITH ALL ACCESSORIES REQUIRED FOR A COMPLETE AND OPERATIVE INSTALLATION.
4. MECHANICAL CONTRACTOR IS RESPONSIBLE TO FIELD MEASURE LOCATION OF NEW OR RELOCATED EQUIPMENT TO VERIFY CLEARANCES WITH THE MANUFACTURER PRIOR TO ORDERING.
5. THESE MECHANICAL DRAWINGS MUST BE READ IN CONJUNCTION WITH THE ARCHITECTURAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
6. THE WORD "PROVIDE" SHALL DENOTE "SUPPLY AND INSTALL". THE WORD "TAB" SHALL DENOTE "TESTING, ADJUSTING, AND BALANCING".
7. CONTRACTOR SHALL FOLLOW THE BIDDING DOCUMENT PROJECT SCHEDULE. UPON AWARD, CONTRACTOR SHALL SUBMIT WORK SCHEDULE TO PROJECT MANAGER & ENGINEER FOR APPROVAL.
8. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE WORK WITH ALL OTHER TRADES AND THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR COMMUNICATING SAFETY REQUIREMENTS TO ITS EMPLOYEES AND COMPLYING WITH OCCUPATIONAL HEALTH AND SAFETY ACT.
9. CONTRACTOR TO PROVIDE, PRIOR TO COMMENCEMENT OF WORK, ONTARIO MINISTRY OF LABOUR CONTRACTOR REGISTRATION FORM AS WELL AS A CURRENT SIGNED AND DATED CORPORATE HEALTH AND SAFETY POLICY.
10. CONTRACTOR TO PROVIDE FOR THE USE OF HIS WORK FORCE A FIRST AID KIT ACCEPTABLE TO WSIB AND MOL.
11. PAY ALL REQUIRED FEES AND PERMITS.
12. WORKMANSHIP AND MATERIALS SHALL MATCH OR EXCEED THAT OF THE EXISTING AS PRESENTED BY THE PROJECT MANAGER.
13. ALL WORK TO BE CONDUCTED DURING HOURS SPECIFIED BY THE PROJECT MANAGER.
14. ALL CHANGES AND CONNECTIONS TO EXISTING SERVICES, REQUIRING THE SHUTDOWN OF THAT SERVICE SHALL BE DONE AT THE TIME DESIGNATED BY THE PROJECT MANAGER, UNLESS OTHERWISE STATED.
15. THE CONTRACTOR SHALL AT ALL TIMES KEEP PREMISES FREE FROM THE ACCUMULATION OF WASTE MATERIAL TO THE SATISFACTION OF THE PROJECT MANAGER. THE CLEANING OF THE AFFECTED AREA SHALL BE CONTINUOUS, PLACE DUST PROTECTION IN THE FORM OF COVER SHEETS OVER EQUIPMENT AND FURNITURE TO ENSURE NO DUST INfiltration.
16. EQUIPMENT REQUIRING CONNECTION TO AN ELECTRICAL POWER SOURCE SHALL BE CSA OR ULC APPROVED FOR USE AT LOCATION OF INSTALLATION.
17. COORDINATE MATERIAL STORAGE WITH THE SITE SUPERINTENDENT AND OTHER TRADES.
18. MANUFACTURER'S INSTRUCTIONS REGARDING THE HANDLING, INSTALLATION AND TESTING OF EQUIPMENT SPECIFIED HEREIN SHALL BE CONSIDERED PART OF THIS SPECIFICATION.
19. SUPPLY TOOLS, EQUIPMENT AND PERSONNEL TO DEMONSTRATE AND INSTRUCT OPERATING AND MAINTENANCE PERSONNEL IN OPERATING, CONTROLLING, ADJUSTING, TROUBLESHOOTING AND SERVICING OF ALL SYSTEMS AND EQUIPMENT DURING REGULAR WORK HOURS, PRIOR TO ACCEPTANCE.
20. MECHANICAL CONTRACTOR SHALL OBTAIN AND PAY FOR HOISTING AND REMOVAL OF MECHANICAL EQUIPMENT. COORDINATE HOISTING SCHEDULE WITH PROJECT MANAGER. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO PUBLIC AND PRIVATE PROPERTY. USE PROPER BARRIERS AND/OR PERSONNEL TO ENSURE HOISTING SAFETY FOR EMPLOYEES AND PUBLIC. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO EQUIPMENT AND/OR PROPERTY DURING HOISTING. ARRANGE AND PAY FOR ANY REQUIRED PERMITS.
21. INSPECT ALL NEW, RELOCATED, AND EXISTING EQUIPMENT WITHIN SCOPE OF WORK. INSPECT EQUIPMENT AT THE BEGINNING OF THE PROJECT, OR UPON DELIVERY, AND NOTIFY PROJECT ENGINEER OF ANY DAMAGE OR DEFICIENCIES.
22. ALL EQUIPMENT, PIPING, DUCTWORK AND WIRING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE.
23. PIPING LAYOUT ILLUSTRATED ON DRAWINGS INDICATES GENERAL ROUTING OF PIPES AND DOES NOT SHOW ALL FITTINGS AND OFFSETS REQUIRED FOR COMPLETE INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PIPING FITTINGS & OFFSETS REQUIRED FOR COORDINATED INSTALLATION WITH OTHER SYSTEMS (DUCTWORK, PIPING, CONDUCITS, LIGHTS, ETC.).
24. PROTECT EXISTING AIR HANDLING SYSTEM FROM CONSTRUCTION DUST. PROVIDE FILTER MEDIA ON RETURN OPENINGS; FASTEN SECURELY TO THE RETURN DUCT INLET; REPLACE DURING CONSTRUCTION AS REQUIRED.
25. DUCT SIZES INDICATED ON DRAWINGS WHERE ACOUSTICALLY LINED ARE FREE AREA SIZES AND NOT SHEET METAL SIZES.
26. COORDINATE DUCTWORK ROUTING PRIOR TO DUCT FABRICATION; IF MODIFICATIONS ARE REQUIRED, REVISE DUCT SIZE TO MAINTAIN CROSS SECTIONAL AREA.
27. ALLOW FOR 1500 MM OF ADJUSTMENT FOR EXACT LOCATION OF AIR HANDLING UNITS, PUMPS, DUCTS, PIPING, ETC. AT NO EXTRA COST OR CREDIT.
28. PRIOR TO CLOSING OF CEILINGS, MECHANICAL CONTRACTOR SHALL NOTIFY THE ENGINEER THAT AN INSPECTION IS REQUIRED BEFORE PROCEEDING.
29. CONTRACTOR TO NOTIFY PROJECT MANAGER 3 DAYS BEFORE SCHEDULED SUBSTANTIAL COMPLETION TO ARRANGE INTERIM INSPECTION AND EQUIPMENT COMMISSIONING. NOTIFY PROJECT MANAGER IN WRITING OF ANY CHANGES IN SCHEDULE.
30. UNLESS INDICATED OTHERWISE PROVIDE ONE (1) YEAR WARRANTY STARTING AT SUBSTANTIAL COMPLETION FOR ALL NEW SYSTEMS INCLUDING MATERIALS, EQUIPMENT & LABOUR.

31. SUBMITTALS:
1. SUBMIT ONE(1) COPY OF SHOP DRAWINGS AND PRODUCT DATA IN ELECTRONIC PDF FORMAT FOR ENGINEER'S REVIEW PRIOR TO PURCHASING AND ORDERING. HARD COPY SHOP DRAWINGS WILL NOT BE ACCEPTED. REVIEWED ELECTRONIC SHOP DRAWINGS WILL BE RE-DISTRIBUTED AS PER PROJECT MANAGER'S INSTRUCTIONS. SHOP DRAWINGS SHALL INCLUDE ALL SPECIFIED EQUIPMENT & SYSTEMS.
2. PROVIDE SUBMITTALS IN ACCORDANCE WITH APPLICABLE CODES REQUIRED FOR OCCUPANCY INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. HVAC:
SEISMIC CERTIFICATION LETTER SUBMITTED.
3. MECHANICAL SCOPE OF WORK CONSIDERED COMPLETE WHEN THE FOLLOWING ITEMS HAVE BEEN RECEIVED AND REVIEWED BY ENGINEER:
1. ALL SHOP DRAWINGS LISTED IN THIS SPECIFICATION.
2. BALANCING REPORT IN ACCORDANCE WITH TAB SECTION IN SPECIFICATIONS.
3. AS-BUILT DRAWINGS SHOWING AS-BUILT CONDITIONS COMPLETE WITH RED LINED MARKUPS TO PROJECT MANAGER WITH CONTRACTOR'S SIGNATURE.
4. START-UP REPORT FROM MANUFACTURER OF EQUIPMENT.
5. THREE (3) COPIES OF OPERATIONS AND MAINTENANCE MANUALS CONTAINING ALL ITEMS PREVIOUSLY REVIEWED BY ENGINEER IN A THREE-RING BINDER AND DIVIDERS ORGANIZING ALL SUBMISSIONS BY EACH MECHANICAL TRADE. OPERATIONS MANUAL TO ALSO INCLUDE THE FOLLOWING BUT SHALL NOT BE LIMITED TO:
1. LIST OF TRADES INVOLVED AND CONTACT INFORMATION.
2. CONTRACTOR'S STATEMENT OF WARRANTY.
3. ALL LETTERS REQUIRED FOR WORKPLACE CONFORMANCE.

MECHANICAL SPECIFICATIONS:

1. SEISMIC RESTRAINT:
1. PROVIDE COMPLETE SEISMIC RESTRAINT SYSTEM FOR ALL MECHANICAL SYSTEMS AS PER ONTARIO BUILDING CODE LATEST EDITION & NFPA13.
2. SEISMIC RESTRAINT DESIGN AND SUPERVISION SHALL BE CONDUCTED AND STAMPED BY A PROFESSIONAL SEISMIC ENGINEER. SUBMIT LETTER AND CALCULATION FOR ENGINEER'S REVIEW PRIOR TO SUBSTANTIAL COMPLETION.
3. THE FINAL CERTIFICATION LETTER SHALL BE FORMATTED TO IDENTIFY THE FOLLOWING WITHIN THE LETTER:
1. THE DATE OF THE FINAL INSPECTION
2. A STATEMENT THAT LISTS ALL CONTRACT DOCUMENTS WHICH WERE REVIEWED INCLUDING BUT NOT LIMITED TO THE MECHANICAL DRAWINGS, PROJECT CHANGE ORDERS, SITE INSTRUCTIONS, ETC.
3. A STATEMENT WHICH CLEARLY IDENTIFIES ANY EXCLUSIONS OF SCOPE OF SERVICE, AND
4. A STATEMENT THAT CERTIFIES THE COMPLETE MECHANICAL SEISMIC INSTALLATION MEETS THE LATEST VERSION OF OBC & APPLICABLE CODES & STANDARDS.
2. INSTALLATION OF PIPEWORK:
1. CLEARANCES:
1. PROVIDE CLEARANCES AROUND SYSTEMS, EQUIPMENT AND COMPONENTS FOR OBSERVATION OF OPERATION, INSPECTION, SERVICING, MAINTENANCE AND AS RECOMMENDED BY MANUFACTURER.
2. PIPE WORK INSTALLATION:
1. SWEAMED FITTINGS TO BE JOINTED WITH POLYETHERETHERETHERETHER THREADED SEAL TAPE.
2. PROTECT OPENINGS AGAINST ENTRY OF FOREIGN MATERIAL.
3. ASSEMBLE PIPING USING FITTINGS MANUFACTURED TO ANSI STANDARDS.
4. EXCEPT WHERE INDICATED OTHERWISE, SLOPE PIPING IN DIRECTION OF FLOW FOR POSITIVE DRAINAGE AND VENTING.
5. EXCEPT WHERE INDICATED, INSTALL SO AS TO PERMIT SEPARATE THERMAL INSULATION OF EACH PIPE.
6. GROUP PIPING WHEREVER POSSIBLE AND AS INDICATED.
7. USE ECCENTRIC REDUCERS AT PIPE SIZE CHANGES TO ENSURE POSITIVE DRAINAGE AND VENTING.
8. PROVIDE DIELECTRIC COUPLINGS WHERE DISSIMILAR METALS ARE JOINED.
3. SLEEVES:
1. INSTALL WHERE PIPES PASS THROUGH CONCRETE STRUCTURES AND FIRE RATED ASSEMBLIES.
2. MATERIAL: SCHEDULE 40 BLACK STEEL PIPE.
3. PROVIDE SPACE FOR FIRE STOPPING. MAINTAIN FIRE RATING INTEGRITY. ENSURE NO CONTACT BETWEEN COPPER PIPE OR TUBE AND SLEEVE.
4. FIRE STOPPING:
1. SEAL ALL PENETRATIONS OF COPPER/STEEL PIPING THROUGH FIRE SEPARATIONS (I.E. WALL/SLAB) WITH ULC LISTED FIRE STOP CAULKING.
2. SEAL ALL PENETRATIONS OF NON-METALLIC PIPING THROUGH FIRE SEPARATIONS (I.E. WALL/SLAB) WITH ULC LISTED FIRE STOP COLLARS.
3. ALL FIRE STOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ULC LISTING.
3. DOMESTIC HOT & COLD WATER PIPING:
1. ABOVE GROUND: COPPER TUBE, HARD DRAWN, TYPE "L"; TO ASTM B88M, CANADA/US MANUFACTURED ONLY.
2. WROUGHT COPPER FITTINGS.
3. LEAD FREE SOLDER, BRAZE OR SILVER SOLDER (SILFOS 5, 5% SILVER)
4. BALL VALVES:
1. CLASS 150
2. BRONZE BODY, STAINLESS STEEL BALL, PTFE TEFLON ADJUSTABLE PACKING, BRASS GLAND AND PTFE TEFLON SEAT, STEEL LEVER HANDLE.
3. ACCEPTABLE MATERIAL: CRANE OR EQUAL.
5. ENSURE ALL NEW PIPING HAS BEEN CLEANED, FLUSHED, AND SANITIZED PRIOR TO INSTALLATION.
6. POTABLE WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF/ANSI 61 ANNEX G.
4. DRAINAGE, WASTE & VENT PIPING:
1. COPPER TYPE DWV ABOVE GRADE; SOLDER: 95/5, 50/50 TO ASTM B32-00EL, TYPE 50A, CANADA/US MANUFACTURED ONLY.
2. FIRE & SMOKE RESISTANT COATED DWV PVC PIPING & FITTINGS, IPEX SYSTEM 875 25/50 PVC-DWV ABOVE GRADE.
3. BELOW GRADE PVC DR208 OR SYSTEM 15.
4. SLOPE SANITARY DRAIN ACCORDING TO CODE.
5. ALLOW FOR LOCATING OF EXISTING BURIED SANITARY PIPING PRIOR TO HANDLING UNITS, PUMPS, DUCTS, PIPING, ETC. AT NO EXTRA COST OR CREDIT.
6. INSTALL BURIED PIPE ON 150 MM (6") BED OF COMPACTED CLEAN GRANULAR A BEDDING COMPACTED TO 95% (MIN.) DRY PROCTOR DENSITY, SHAPED TO ACCOMMODATE HUBS AND FITTINGS, TO LINE AND GRADE AS INDICATED. THE MATERIAL SHOULD BE PLACED IN MAXIMUM 300 MM THICK LIFTS. (IF TRENCH BOTTOM IS UNSTABLE, BRING TO ENGINEER'S ATTENTION BEFORE BEDDING IS LAID). LIMIT VERTICAL DEFLECTION AND INCREASE PIPE SUPPORT BY COMPACTING SOIL IN BOTH DIRECTIONS AWAY FROM THE PIPE TOWARD TRENCH WALLS.
7. INITIAL BACKFILL TO BEGIN AT SPRINGLINE OF PIPE TO 300 MM (12") ABOVE PIPE USING COMPACTED CLEAN GRANULAR A BEDDING COMPACTED TO 95% (MIN.) DRY PROCTOR DENSITY. FINAL BACKFILL SHALL BE IN ACCORDANCE WITH GEOTECHNICAL REPORT AND AS MINIMUM YELLOWING UV STABILIZER. BACKFILL TO 95% DRY PROCTOR DENSITY IN 300 MM THICK LIFTS. BEDDING AND BACKFILL SHALL BE PROVIDED BY THIS DIVISION AND IN ACCORDANCE WITH DIV. 02 – SITE WORK.
7. PRESSURE TEST BURIED SYSTEMS BEFORE BACKFILLING.
8. VIDEO TESTING:
1. PROVIDE VIDEO SCANNING OF UNDERGROUND SANITARY AND STORM PIPING FROM ROOF DRAINS FOR CONTRACTOR'S REVIEW AND APPROVAL PRIOR TO POURING OF CONCRETE (UNDERGROUND SANITARY) AND REINSTALLATION OF ROOF DRAINS (STORM). REPAIR DEFICIENCIES AND RE-SCAN AS REQUIRED. SUBMIT FINAL VIDEO TO ENGINEER FOR RECORD.
2. FLUSH & VIDEO SCAN SANITARY AND STORM PIPING FOR CONTRACTOR'S REVIEW AND APPROVAL PRIOR TO BUILDING TURNOVER. REPAIR DEFICIENCIES AND RE-SCAN AS REQUIRED. SUBMIT FINAL VIDEO TO ENGINEER FOR RECORD.
9. INSTALL IN ACCORDANCE WITH CANADIAN PLUMBING CODE, PROVINCIAL PLUMBING CODE AND LOCAL AUTHORITY HAVING JURISDICTION.

CONDENSATE PIPING:

1. PIPING DESIGNED TO ENSURE COMPLETE REMOVAL OF ALL WATER. DRAIN CONNECTIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND DRAIN INTO NEAREST HUB DRAIN STANDING TIGHT TO THE SLAB.
2. COPPER TUBE, HARD DRAWN, TYPE "L", CANADA/US MANUFACTURED ONLY.
3. WROUGHT COPPER FITTINGS.
4. LEAD FREE SOLDER, BRAZE OR SILVER SOLDER (SILFOS 5, 5% SILVER)
6. REFRIGERANT COPPER TUBING:
1. TUBING:
1. PROCESSED FOR REFRIGERATION INSTALLATIONS, DEOXYGENATED, DEHYDRATED AND SEALED.
2. HARD COPPER TO ASTM B280, TYPE ACR.
3. SOFT COPPER: ANNEALED, TO ASTM B280, WITH MINIMUM WALL THICKNESS AS PER CSA B52 SMART AND ASME B31.5, BARE OR PRE-INSULATED.
2. FITTINGS:
1. SERVICE: DESIGN PRESSURE TEMPERATURE TO SUIT REFRIGERANT TYPE.
2. BRAZED:
1. FITTINGS: WROUGHT COPPER TO ASME B16.22.
2. JOINTS: SILVER SOLDER, 45% AG-15% CU AND NON-CORROSIVE FLUX.
3. FLANGED:
1. BRONZE OR BRASS, TO ASME B16.24, CLASS TO SUIT REFRIGERANT TYPE.
2. GASKETS: SUITABLE FOR SERVICE.
3. BOLTS, NUTS AND WASHERS: TO ASTM A307, HEAVY SERIES.
4. FLARED:
1. BRONZE OR BRASS, FOR REFRIGERATION, TO ANSI/ASME16.26.
3. PIPE SLEEVES:
1. LEAD COPPER OR STEEL, SIZED TO PROVIDE 7 MM (1/4") CLEARANCE ALL AROUND BETWEEN SLEEVE AND UNINSULATED PIPE OR BETWEEN SLEEVE AND INSULATION.
4. VALVES:
1. 20 MM (3/4") AND OVER: CLASS TO SUIT REFRIGERANT TYPE, GLOBE OR ANGLE NON-DIRECTIONAL TYPE, DIAPHRAGM, PACKLESS TYPE, WITH FORGED BRASS BODY AND BONNET, MOISTUREPROOF SEAL FOR BELOW FREEZING APPLICATIONS, BRAZED CONNECTIONS.
2. OVER 20 MM (3/4") - CLASS TO SUIT REFRIGERANT TYPE, GLOBE OR ANGLE TYPE, DIAPHRAGM, PACKLESS TYPE, BACK-SEATING, CAP SEAL, WITH CAST BRONZE BODY AND BONNET, MOISTUREPROOF SEAL FOR BELOW FREEZING APPLICATIONS, BRAZED CONNECTIONS.
5. INSULATION:
1. ALL COMPONENTS OF INSULATION SYSTEM TO HAVE MAXIMUM FLAME SPREAD RATING OF 25 AND MAXIMUM SMOKE DEVELOPED RATING OF 50 IN ACCORDANCE WITH CAN-5102.
2. TAC CODE A-6: FLEXIBLE UNICELLULAR TUBULAR ELASTOMER.
1. TO ASTM C534 WITH ANTI-MICROBIAL PROTECTION.
2. "K" VALUE: 0.04 W/m°C AT 24°C MEAN TEMPERATURE.
3. TEMPERATURE RANGE: -4°C TO 100°C.
4. 25/50 RATED TO ASTM E84.
5. UV RESISTANT.
6. THICKNESS: 25 MM UNLESS OTHERWISE INDICATED.
7. ACCEPTABLE MATERIAL: ARCELL AP ARMOFLEX, BLACK LAP SEAL, KEROL, SPT, OR APPROVED EQUAL.
6. INSULATION SECUREMENT: TAPE: SELF-ADHESIVE, REINFORCED, 50 MM WIDE MINIMUM TO INSULATION MANUFACTURER'S RECOMMENDATION.
7. JACKETS:
1. ALUMINUM ON ALL OUTDOOR PIPING:
1. TO ASTM B209.
2. THICKNESS: 0.50 MM SHEET.
3. FINISH: EMBOSSED.
4. JOINTING: LONGITUDINAL AND CIRCUMFERENTIAL SLIP JOINTS WITH 50 MM LAPS.
5. FITTINGS: 0.5 MM THICK DIE-SHAPED FITTING COVERS WITH FACTORY-ATTACHED PROTECTIVE LINER.
6. METAL JACKET BANDING AND MECHANICAL SEALS: STAINLESS STEEL, 19 MM WIDE, 0.5 MM THICK AT 300 MM SPACING.
8. INSTALLATION:
1. HARD DRAWN COPPER TUBING: DO NOT BEND. MINIMIZE USE OF FITTINGS.
2. SUPPORT PIPING USING UNISTRUT WITH CUSHION CLAMPS.
3. HOT GAS LINES:
1. PITCH AT LEAST 1:240 DOWN IN DIRECTION OF FLOW TO PREVENT OIL RETURN TO COMPRESSOR DURING OPERATION.
2. PROVIDE TRAP AT BASE OF RISERS GREATER THAN 2,400 MM (8 FEET) HIGH.
3. PROVIDE INVERTED DEEP TRAP AT TOP OF EACH RISER.
4. PROVIDE DOUBLE RISERS FOR COMPRESSORS HAVING CAPACITY MODULATION.
1. LARGE RISER: INSTALL TRAPS AS SPECIFIED ABOVE.
2. SMALL RISER: SIZE FOR 5.1M/S AT MINIMUM LOAD.
CONNECT UPSTREAM OF TRAPS ON LARGE RISER.
4. PRESSURE, LEAK TEST, PURGE, AND EVACUATE TO MANUFACTURER'S RECOMMENDATIONS.

THERMAL INSULATION FOR PIPING:

1. ALL COMPONENTS OF INSULATION SYSTEM TO HAVE MAXIMUM FLAME SPREAD RATING OF 25 AND MAXIMUM SMOKE DEVELOPED RATING OF 50 IN ACCORDANCE WITH CAN-5102.
2. TAC CODE A-3 FORMED MINERAL FIBRE WITH FACTORY APPLIED VAPOUR RETARDER JACKET.
1. APPLICATION: FOR PIPING, VALVES AND FITTINGS ON:
1. DOMESTIC HOT WATER PIPING SYSTEMS.
2. DOMESTIC COLD WATER PIPING SYSTEMS.
3. CONDENSATE PIPING SYSTEM.
2. MATERIAL:
1. MINERAL FIBRE: TO CAN/CSG58-51.9-92.
2. JACKET: TO CSG58 51-92-52MA.
3. MAXIMUM "K" FACTOR: TO CAN/CSG58-51.9-92.
3. THICKNESS: AS PER TABLE BELOW:

APPLICATION	TEMP (°C)	PIPE SIZES (NPS) AND INSULATION THICKNESS (MM)				≥6
		1/2	1-1/4	2	TO 6	
DOM.HOT WATER	ALL	25	40	40	40	25
DOM.COLD WATER	ALL	25	25	25	25	25

4. FASTENINGS:
1. FOR INSULATION SYSTEMS TAC CODE: A-3.
1. SECUREMENTS: TAPE AT 300 MM OC.
2. SEALS: VR LAP SEAL ADHESIVE, VR LACING ADHESIVE.
3. INSTALLATION: TAC CODE: 1501-C.
5. JACKETS:
1. PVC:
1. ONTARIO BUILDING CODE COMPLIANT FOR 25/50 FLAME SPREAD AND SMOKE DEVELOPED.
2. MINIMUM THICKNESS 0.38 MM.
3. COLOUR WHITE UNLESS OTHERWISE SPECIFIED.
4. MINIMUM YELLOWING UV STABILIZER.
5. MINIMUM SERVICE TEMPERATURES: -20°C.
6. MAXIMUM SERVICE TEMPERATURES: 65°C.
7. MOISTURE VAPOUR TRANSMISSION: 0.02 PERM.
8. FASTENINGS:
1. USE SOLVENT WELD ADHESIVE COMPATIBLE WITH INSULATION TO SEAL LAPS AND JOINTS.
2. TACKS.
3. PRESSURE SENSITIVE VINYL TAPE OF MATCHING COLOUR.
2. APPLICATION:
1. EXPOSED PIPING & FITTINGS INDOORS: PVC.
2. CONCEALED, INDOORS: PVC ON VALVES AND FITTINGS ONLY, NO FURTHER FINISH.
3. USE VAPOUR RETARDER JACKET ON TAC CODE A-3 INSULATION COMPATIBLE WITH INSULATION.
4. FINISH ATTACHMENTS: STAINLESS STEEL BANDS AT 150 MM O.C. SEALS: WING OR CLOSED.
5. INSTALLATION: TO APPROPRIATE TAC CODE CPF/1

BASES, PIPE HANGERS AND SUPPORTS:

1. GENERAL:
1. BASES, HANGERS, SUPPORTS AND SWAY BRACES SHALL BE OF MANUFACTURED TYPE AND ASSEMBLED AS PER MANUFACTURER'S INSTRUCTIONS. ENSURE THAT SUPPORTS, GUIDES AND ANCHORS DO NOT TRANSMIT EXCESSIVE QUANTITIES OF HEAT TO BUILDING STRUCTURE. DESIGN HANGERS AND SUPPORTS TO OPERATE UNDER ALL OPERATING CONDITIONS. ALLOW FOR FREE EXPANSION AND CONTRACTION AND PREVENT THE TRANSMISSION OF EXCESSIVE STRESSES INTO PIPE WORK OR CONNECTED EQUIPMENT. PROVIDE FOR VERTICAL ADJUSTMENT AFTER INSTALLATION. DESIGN SHALL BE IN ACCORDANCE WITH ANSI B31.1 AND MSS-SP58.
2. SUPPORT FROM TOP OR BOTTOM OF STRUCTURAL MEMBERS (EXCEPT ROOF DECK), WHERE STRUCTURAL BEARING DOES NOT EXIST OR INSERTS ARE NOT IN SUITABLE LOCATIONS, PROVIDE SUPPLEMENTARY STRUCTURAL STEEL MEMBERS.
3. SUPPORTS MADE FROM WIRE, WOOD, ROPE OR ANY OTHER VULNERABLE MAKE-SHIFT MATERIAL ARE NOT PERMITTED.
4. FOR UNINSULATED COPPER PIPE OR TUBING THE CLAMPS AND SUPPORTS SHALL HAVE AN ELECTROPLATED COPPER FINISH.
5. PROVIDE ADDITIONAL SUPPORTS AT CHANGES IN PIPE DIRECTION AND FOR CONCENTRATION OF LOADS DUE TO WEIGHT OF VALVES, STRAINERS, ETC.
6. PIPE HANGERS AND SUPPORTS SHALL BE PAINTED WITH ZINC RICH PAINT AFTER MANUFACTURE.
7. PROVIDE INSULATION PROTECTION SHIELDS AS REQUIRED.
2. BASE MOUNTED EQUIPMENT:
1. PROVIDE A 100MM (4") HIGH AND 50MM (2") LARGER ALL ROUND THAN EQUIPMENT CONCRETE HOUSE KEEPING PAD C/W CHAMFERED EDGES AND ANCHORED TO THE STRUCTURAL SLAB.
2. ALL EQUIPMENT TO BE SUPPORTED BY STRUCTURAL GRADE STEEL C/W NEOPRENE PAD VIBRATION ISOLATION AND ANCHORED TO THE BUILDING STRUCTURE.
3. ROOF MOUNTED PIPE/DUCT SUPPORTS:
1. SUPPORT TYPE 1 (S1): FREE-STANDING, ONE PIECE INJECTED MOULDED UV RESISTANT POLYPROPYLENE SHELL AND CLOSED CELL EXTRUDED POLYSTYRENE BASE WITH 300 MM HIGH U-SHAPED MOUNTING CHANNEL AND 13 MM STEEL RODS, NUTS & WASHERS SHALL BE SEISMICALLY RESTRAINED IN ACCORDANCE WITH THE LATEST EDITION OF OBC, AND IN ACCORDANCE WITH THIS SPECIFICATION.
1. ACCEPTABLE MATERIALS: PORTABLE PIPE HANGERS (PPH), BIG FOOT SYSTEMS, MIFAB, MICRO INDUSTRIES, OR APPROVED EQUAL.
4. INSULATED PIPE SADDLES:
1. INSULATED SADDLES SHALL BE INSTALLED BY THE MECHANICAL CONTRACTOR WHEN SETTING PIPE ELEVATION AT ALL PIPE SUPPORT LOCATIONS ON INSULATED SYSTEMS OPERATING BETWEEN -290°F AND 250°F, INCLUDING:
1. DOMESTIC COLD WATER, CHILLED WATER, CONDENSER WATER, CONDENSATE, DOMESTIC HOT WATER, HEATING WATER, AND LOW PRESSURE STEAM.
2. COMPOSITION INCLUDES:
1. RIGID PHENOLIC FOAM INSULATION THAT MEETS ASTM E-84 (25/50 FLAME SPREAD) / SMOKE DEVELOPED REQUIREMENT) WITH DENSITY OF:
1. 3.75 PCF (0.17 BTU-IN/HR-SQ-FT-F) @ 75°F MEAN FOR PIPE SIZES UP TO 10" IPS.
2. 5 PCF (0.20 BTU-IN/HR-SQ-FT-F) @ 75°F MEAN FOR PIPING 11" IPS TO 30" IPS.
2. ZERO PERM RATED (ASTM E-96), ABUSE-RESISTANT VAPOUR BARRIER JACKET WITH 1-1/2" WIDE LONGITUDINAL SELF-SEALING ACRYLIC TAPE CLOSURE SYSTEM.
3. PIPE INSULATION PROTECTION SHIELD, MANUFACTURED FROM CARBON STEEL WITH A G90 GALVANIZED FINISH, CENTERED AND ADHERED TO BOTTOM WITH A MINIMUM OF 1-1/2" JACKETED INSULATION EXTENDING FROM EACH SIDE TO ALLOW PROPER CIRCUMFERENTIAL CLOSURE AT BUTT JOINTS WITH 3" WIDE ZERO PERM TAPE. SHIELDS SHALL BE 20 GAUGE THICK UP TO 3-1/2" PIPING, 18 GAUGE FOR PIPING FROM 4" TO 10" DIAMETER.
3. ACCEPTABLE MATERIAL: BUCKAROOS COOLDRY, MULTIGLASS M-SADDLE, OR EQUIVALENT.
5. HANGER SPACING:
1. COPPER PIPING UP TO NPS 1/2" EVERY 5FT.
2. HANGERS SHALL BE WITHIN 12" OF EACH ELBOW.
3. HANGERS SHALL BE SPACED IN ACCORDANCE WITH THE MOST STRINGENT REQUIREMENTS OF MANUFACTURER'S RECOMMENDATIONS, CANADIAN PLUMBING CODE, OBC, AUTHORITY HAVING JURISDICTION, AND AS FOLLOWS:

MAXIMUM PIPE SIZE (NPS):	MAXIMUM STEEL PIPE SPACING:	MAXIMUM COPPER PIPE SPACING:
UP TO 1-1/4	2.5M	2.5M
1-1/2	2.5M	3.0M
2	2.5M	3.0M
2-1/2	2.5M	3.0M
3	2.5M	3.0M
4	2.5M	3.0M

PIPE IDENTIFICATION:

1. PVC MARKERS, CONTINUOUS OPERATING TEMPERATURE OF 212F, 2" HIGH LETTERING FOR PIPING 3" OR LARGER, 3/4" HIGH LETTERING FOR 2 1/2" OR SMALLER. MATCH EXISTING BASE BUILDING STANDARD OR AS FOLLOWS:

CONTENTS:	BACKGROUND:	LABEL:
DOMESTIC HOT WATER SUPPLY	GREEN	DOM. HW SUPPLY
DOM.HWS RECIRCULATION	GREEN	DOM. HW REC
DOMESTIC COLD WATER SUPPLY	GREEN	DOM. CWS
SANITARY	GREEN	SAN.
PLUMBING VENT	GREEN	SAN. VENT

PLUMBING SPECIALTIES AND ACCESSORIES:

1. FLOOR DRAINS:
1. FDI: GENERAL DUTY; EPOXY COATED CAST IRON BODY, ROUND, 5/8" ADJUSTABLE STANDARD NICKEL-BRONZE HEAD, TRAP PRIMING CONNECTION, INTEGRAL SEEPAGE PAN, AND CLAMPING COLLAR.
ACCEPTABLE MATERIAL: WATTS FD-100-A OR EQUIVALENT MIFAB, ZURN & J.R. SMITH.
2. TRAP SEAL PRIMERS:
1. TYPE 1: FOR USE ON URINAL OR WATER CLOSET COLD WATER LINE.
1. PRESSURE DROP ACTIVATED TYPE, ALL BRASS CONSTRUCTION WITH "O" RING SEALS, 12 MM (NPT 1/2") MALE INLET & 12 MM (NPT 1/8") FEMALE OUTLET DRIP LINE CONNECTION WITH VIEWING HOLES, AND REMOVABLE FILTER SCREEN. TRAP PRIMER SHALL HAVE NO ADJUSTMENT. OPERATING RANGE SHALL BE 1.38 KPA (20 PSI) TO 861 KPA (125 PSI), OPERATES ON PRESSURE DROP OF MINIMUM 20 KPA (3 PSI). ONE (1) TO SIX (6) DRAIN TAPS PER UNIT.
2. IDENTIFY ON AS-BUILT DRAWINGS THE LOCATION OF EACH TRAP SEAL PRIMER.
3. ENSURE ALL TRAP SEAL PRIMERS ARE ACCESSIBLE FOR MAINTENANCE PURPOSES AND ARE CONNECTED TO URINAL OR WATER CLOSET COLD WATER LINE. TRAP LINE SHALL BE FROM TOP OF COLD WATER LINE AND INCLUDE A SERVICE VALVE. ALL TO BE SERVICEABLE FROM ACCESS DOORS.
4. ACCEPTABLE MATERIALS: MIFAB M-500, WATTS, ZURN.
2. PROVIDE AN AIR GAP FITTING SERVING EACH TRAP SEAL PRIMER IF TRAP SEAL PRIMER DOES NOT INCLUDE INTEGRAL AIR GAP OR AIR SPACE TYPE VACUUM BREAKER IN ACCORDANCE WITH CSA-B64.10.

CLEANOUTS:

1. CLEANOUT PLUGS: HEAVY CAST IRON MALE FERRULE WITH BRASS SCREWS AND THREADED BRASS OR BRONZE PLUGS. RECOMMENDED LEAD SEAT OR NEOPRENE GASKET.
1. ACCEPTABLE MATERIAL: ANCON, ENPOCO, J.R. SMITH & ZURN.
2. ACCESS COVERS:
1. FLOOR ACCESS: ROUND CAST IRON BODY AND FRAME WITH ADJUSTABLE SECURED NICKEL BRONZE TOP AND:
1. PLUGS: BOLTED BRONZE WITH NEOPRENE GASKET.
2. COVER FOR TERRAZZO FINISH: POLISHED NICKEL BRONZE WITH RECESSED COVER FOR FILLING WITH TERRAZZO, VANDAL-PROOF LOCKING SCREWS.
3. COVER FOR TILE AND LINOLEUM FLOORS: POLISHED NICKEL BRONZE WITH RECESSED COVER FOR LINOLEUM OR TILE INFILL, COMPLETE WITH VANDAL-PROOF LOCKING SCREWS.

PLUMBING FIXTURE AND TRIM:

1. FIXTURE PIPING:
1. HOT AND COLD WATER SUPPLIES TO EACH FIXTURE:
1. SUPPLY STOPS SHALL BE ALL BRASS WITH FULL TURN BRASS SEAMS AND REPLACABLE WASHER ATTACHMENT SHALL BE IPS INLET x COMPRESSION OO OUTLET TO FIXTURE. ALL FIXTURE STOP VALVES SHALL BE SCREW DRIVER TYPE.
2. CHROME PLATED IN ALL EXPOSED PLACES.
2. WASTE:
1. CAST BRASS ADJUSTABLE STYLE P-TRAP WITH CLEANOUT ON EACH FIXTURE NOT HAVING INTEGRAL TRAP.
2. CHROME PLATED IN ALL EXPOSED PLACES.
3. SINK AND LAVATORY HEAVY GAUGE P-TRAPS SHALL BE CAST BRASS ADJUSTABLE STYLE WITH 17 GA. SEAMLESS BRASS WALL BEND. ATTACHMENT NUTS SHALL BE BRASS, NO ZINC ALLOWED. P-TRAPS TO BE REMOVABLE/JUNCTION TYPE OR TO INCLUDE CLEANOUT.
4. LAVATORY STRAINERS SHALL BE CHROME PLATED CAST BRASS WITH 17 GA. SEAMLESS BRASS TAILPIECE.
5. ALL BARRIER-FREE TOILETS AND SINKS SHALL HAVE CHROME PLATED OFFSET TAIL PIECE IN ADDITION TO P-TRAP WITH CLEANOUT. INSULATE P-TRAP AND HOT & COLD WATER PIPS WITH PRE-FORMED & FINISHED SURFACE INSULATION. ARMAFLEX INSULATION AND TAPE NOT ACCEPTABLE.
6. URINAL WASTE PIPE & FITTINGS SHALL BE DWV PVC EQUIVALENT TO PEX SYSTEM 15. EXTEND PLASTIC PIPING UP TO COMBED WASTE FROM ADJACENT LAVATORY OR OTHER PLUMBING FIXTURES ALLOWING DILUTION OF WASTE.
2. FIXTURES:
1. MANUFACTURE IN ACCORDANCE WITH CSA B45.
2. ALL PRODUCTS, WHERE APPLICABLE, SHALL BE MARKED WITH MANUFACTURER'S NAME OR PRODUCT #.
3. TRIM, FINISHES: MANUFACTURE IN ACCORDANCE WITH CSA B125.
4. NUMBER, LOCATIONS: ARCHITECTURAL DRAWINGS TO GOVERN.
5. FIXTURES IN ANY ONE LOCATION BE PRODUCT OF ONE MANUFACTURER AND OF SAME TYPE.
6. TRIM IN ANY ONE LOCATION TO BE PRODUCT OF ONE MANUFACTURER AND OF SAME TYPE UNLESS OTHERWISE INDICATED.
7. CORRUGATED TYPE, PROVIDE FOR ALL WALL MOUNTED PLUMBING FIXTURES.
8. ROUGH-IN: IN FIXTURES: ROUGH-IN FOR EQUIPMENT SUPPLIED BY OTHER TO BE COMPLETE WITH VALVED SUPPLIES, WASTES AND VENTS, CAPPED AND ASSOCIATED FITTING PIPING & REDUCERS.
9. CONTRACTOR IS RESPONSIBLE TO ENSURE INSTALLATION OF FIXTURES MEETS BARRIER-FREE REQUIREMENTS OF OBC WHERE APPLICABLE.
10. CONTRACTOR IS RESPONSIBLE TO ENSURE PROPER OPERATION OF FIXTURES UP TO 10 PSI (550 KPA).
11. PLUMBING FIXTURES: REFERENCE FIXTURE SCHEDULE ON DRAWINGS.
12. DUCTWORK:
1. GENERAL:
1. DETAILS, CONSTRUCTION AND MATERIALS HEREIN SHALL BE AS PER SMACNA STANDARDS.
2. ALL MATERIALS SHALL CONFORM TO SMOKE AND FLAME SPREAD RATING LIMITATIONS STIPULATED IN THE PROVINCIAL BUILDING CODE OR AS SPECIFIED HEREIN.
3. ALL GALVANIZED DUCTWORK INDICATED TO BE FABRICATED FROM 0.2% COPPER CONTENT GALVANIZED SHEET STEEL WITH 1-1/4 CLASS ZINC COATING.
4. RECTANGULAR AND FITTINGS: GALVANIZED STEEL, GAUGE TO SMACNA.
5. ROUND & OVAL DUCT AND FITTINGS SHALL BE SPIRAL GALVANIZED STEEL MEETING THE ASTM A-527-71, GAUGE TO SMACNA.
6. SEAL CLASSIFICATION: SMACNA SEAL CLASS A.
13. THERMAL INSULATION FOR DUCTING:
1. FLAME AND SMOKE:
1. IN ACCORDANCE WITH CAN/ULC S102:
1. MAXIMUM FLAME SPREAD RATING: 25.
2. MAXIMUM SMOKE DEVELOPED RATING: 50.
2. INSULATION:
1. MINERAL FIBRE AS SPECIFIED HEREIN INCLUDES GLASS FIBRE, ROCK WOOL, SLAG WOOL.
2. THERMAL CONDUCTIVITY ("K" FACTOR) NOT TO EXCEED SPECIFIED VALUES AT 24°C MEAN TEMPERATURE WHEN TESTED IN ACCORDANCE WITH ASTM C335/C335M.
3. RIGID MINERAL FIBRE BOARD TO CAN/CSG58-51.10, WITH FACTORY APPLIED VAPOUR RETARDER JACKET TO CSG58 51-92-52MA.
4. MINERAL FIBRE BLANKET TO CAN/CSG58-51.11 FACED WITH FACTORY APPLIED VAPOUR RETARDER JACKET TO CSG58 51-92-52MA.
1. MINERAL FIBRE: TO CAN/CSG58-51.11.
2. JACKET: TO CSG58 51-92-52MA.
3. MAXIMUM "K" FACTOR: TO CAN/CSG58-51.11.
4. DENSITY: 24 KG/M3.
3. JACKETS:
1. FOR INSULATED EXPOSED DUCTWORK INDOORS:
1. ACRYLIC ADHESIVE:
1. THICKNESS: 0.18MM.
2. FINISH: WHITE.
3. PEEL ADHESION: 18N/25MM (850Z/IN.)
4. PUNCTURE: 130N (30LBS.).
5. UL 723 LISTED (10/20 FLAME/SMOKE RATING).
6. ACCEPTABLE MATERIAL: VENTURECLAD 1577CW.
2. FOR ALL EXPOSED DUCTWORK OUTDOORS:
1. ALUMINUM:
1. TO ASTM B209 WITH MOISTURE BARRIER.
2. THICKNESS: 0.50 MM SHEET.
3. FINISH: STUCC

- .5 DUCTWORK INSULATION SCHEDULE:
- | INSULATION TYPES AND THICKNESSES: CONFORM TO FOLLOWING TABLE: | THICKNESS: |
|---|------------|
| DUCT TYPE: | |
| EXHAUST AIR WITHIN 3M FROM OUTSIDE | 50 (2") |
| SUPPLY AIR EXPOSED IN SPACE BEING SERVED | NONE |
| DUCTWORK OUTSIDE | 50 (2") |

14. IDENTIFICATION DUCTWORK SYSTEMS:

- .1 2" HIGH STENCILLED LETTERS AND DIRECTIONAL ARROWS 6" LONG X 2" HIGH.
- .2 COLOURS: BLACK, OR CO-ORDINATED WITH BASE COLOUR TO ENSURE STRONG CONTRAST.

15. FANS:

- .1 GENERAL:
- .1 STANDARD OF RATING:
- .1 AMCA 201 FOR FAN APPLICATION.
- .2 AMCA 302 FOR APPLICATION OF SOME LOUDNESS RATINGS FOR NON-DUCTED AIR MOVING DEVICES.
- .3 AMCA 303 FOR APPLICATION OF SOUND POWER RATINGS FOR DUCTED AIR MOVING DEVICES.
- .4 PERFORMANCE: TO ANSI/AMCA 210 AND ANSI/ASHRAE 51. UNIT TO BEAR AMCA CERTIFIED SEAL.
- .2 PWL SOUND RATINGS TO COMPLY WITH AMCA 303, TESTED TO ANSI/AMCA 300 UNIT TO BEAR AMCA CERTIFIED SOUND RATING SEAL.
- .3 ANGLE MOUNTING BRACKETS CAN BE ADJUSTED TO ANY TYPICAL CEILING MATERIAL THICKNESS.
- .4 ALL DIRECT DRIVE FANS SHALL BE SUPPLIED WITH VARIABLE SPEED CONTROLLER FOR INSTALLATION AND WIRING BY DIV. 26.
- .5 PERFORMANCE: AS INDICATED ON DRAWING SCHEDULE
- .6 ACCEPTABLE MATERIAL: GREENHECK, PENNBARRY AND CANAM.
- .2 WASHROOM CEILING EXHAUST:
- .1 CEILING MOUNTED EXHAUST FANS SHALL BE OF THE CENTRIFUGAL DIRECT DRIVE TYPE. THE FAN HOUSING SHALL BE CONSTRUCTED OF ZINC COATED STEEL. THE STEEL DUCT COLLAR SHALL BE THE DIAMETER AS INDICATED AND SHALL INCLUDE A BACKDRAFT DAMPER. THE DESIGNER GRILLE SHALL BE CONSTRUCTED OF NON-YELLOWING HIGH IMPACT POLYSTYRENE AND ATTACHED TO THE HOUSING WITH HIDDEN PAINTED SCREWS. THE ACCESS FOR WIRING SHALL BE EXTERNAL. THE MOTOR DISCONNECT SHALL BE INTERNAL AND OF THE PLUG IN TYPE.
- .2 FAN WHEEL SHALL BE OF THE FORWARD CURVED CENTRIFUGAL TYPE, CONSTRUCTED OF CALCIUM CARBONATE FILLED POLYPROPYLENE AND DYNAMICALLY BALANCED. ALL FANS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR SOUND AND AIR PERFORMANCE AND SHALL BE UL/CUL LISTED.
- .3 EC MOTOR WITH A BUILT-IN PRECISION AIRFLOW SELECTOR.

16. ROOFTOP UNIT:

- .1 GENERAL:
- .1 ALL UNITS SHALL BE FACTORY ASSEMBLED, INTERNALLY WIRED, FULLY CHARGED WITH R-454B, AND 100 PERCENT RUN TESTED TO CHECK COOLING OPERATION, FAN AND BLOWER ROTATION, AND CONTROL SEQUENCE BEFORE LEAVING THE FACTORY. WIRING INTERNAL TO THE UNIT SHALL BE COLOURED AND NUMBERED FOR SIMPLIFIED IDENTIFICATION. UNITS SHALL BE UL/C LISTED AND LABELED, CLASSIFIED FOR CENTRAL COOLING AIR CONDITIONERS.
- .2 ROOFTOP UNIT SHALL MEET OR EXCEED ASHRAE 90.1 COMPLIANCE REQUIREMENTS.
- .2 CASING:
- .1 UNIT CASING SHALL BE CONSTRUCTED OF ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL. EXTERIOR SURFACES SHALL BE CLEANED, PHOSPHATIZED, AND FINISHED WITH A WEATHER-RESISTANT BAKED ENAMEL FINISH. UNIT'S COMPLIANCE SHALL BE TESTED IN A SALT SPRAY TEST IN SURFACE WITH ASTM B117. CABINET CONSTRUCTION SHALL ALLOW FOR ALL MAINTENANCE ON ONE SIDE OF THE UNIT. SERVICE PANELS SHALL HAVE HINGED PANELS WHILE PROVIDING A WATER AND AIR TIGHT SEAL. ALL EXPOSED VERTICAL PANELS AND TOP COVERS IN THE INDOOR AIR SECTION SHALL BE INSULATED WITH A CLEANABLE, FOIL-FACED, FIRE-RETARDANT, PERMANENT, ODORLESS, GLASS FIBRE MATERIAL. THE BASE OF THE UNIT SHALL BE INSULATED WITH 1/8" INCH, FOIL-FACED, CLOSED-CELL INSULATION. ALL INSULATION EDGES SHALL BE EITHER CAPTURED OR SEALED. THE UNIT'S BASE PAN SHALL HAVE NO PENETRATIONS WITHIN THE PERIMETER OF THE CURB OTHER THAN THE RAISED DOWNFLOW SUPPLY/RETURN OPENINGS TO PROVIDE AN ADDED WATER INTEGRITY PRECAUTION, IF THE CONDENSATE DRAIN BACKS UP.
- .3 UNIT TOP:
- .1 THE TOP COVER SHALL BE ONE PIECE CONSTRUCTION OR, WHERE SEAMS EXIST, IT SHALL BE DOUBLE-HEMMED AND GASKET-SEALED. THE RIBBED TOP ADDS EXTRA STRENGTH AND ENHANCES WATER REMOVAL FROM UNIT TOP.
- .4 COMPRESSORS:
- .1 ALL UNITS SHALL HAVE DIRECT-DRIVE, HERMETIC, SCROLL TYPE COMPRESSORS WITH CENTRIFUGAL TYPE OIL PUMPS. MOTOR SHALL BE SUCTION GAS-COOLED AND SHALL HAVE A VOLTAGE UTILIZATION RANGE OF PLUS OR MINUS 10 PERCENT. IF UNIT NAMEPLATE VOLTAGE, INTERNAL OVERLOADS SHALL BE PROVIDED WITH THE SCROLL COMPRESSORS.
- .5 INDOOR FAN:
- .1 THE UNITS SHALL BE EQUIPPED WITH A DIRECT DRIVE PLENUM FAN DESIGN. PLENUM FAN DESIGN SHALL INCLUDE A BACKWARD-CURVED FAN WHEEL ALONG WITH AN EXTERNAL ROTOR DIRECT DRIVE VARIABLE SPEED INDOOR MOTOR. ALL PLENUM FAN DESIGNS WILL HAVE A VARIABLE SPEED ADJUSTMENT POTENTIOMETER LOCATED IN THE CONTROL BOX. ALL UNITS (STANDARD EFFICIENCY) SHALL HAVE BELT DRIVE MOTORS WITH AN ADJUSTABLE IDLER-ARM ASSEMBLY FOR QUICK-ADJUSTMENT TO FAN BELTS AND MOTOR SHEAVES. ALL MOTORS SHALL BE THERMALLY PROTECTED. ALL INDOOR FAN MOTORS SHALL MEET ASHRAE 90.1.
- .6 OUTDOOR FANS:
- .1 THE OUTDOOR FAN SHALL BE DIRECT-DRIVE, STATICALLY AND DYNAMICALLY BALANCED, DRAW-THROUGH IN THE VERTICAL DISCHARGE POSITION. THE FAN MOTOR SHALL BE PERMANENTLY LUBRICATED AND SHALL HAVE BUILT-IN THERMAL OVERLOAD PROTECTION.
- .7 EVAPORATOR AND CONDENSER COILS:
- .1 INTERNALLY FINNED, COPPER TUBES MECHANICALLY BONDED TO A CONFIGURED ALUMINUM PLATE FIN SHALL BE STANDARD. COILS SHALL BE LEAK TESTED AT THE FACTORY TO ENSURE THEIR PRESSURE INTEGRITY. THE EVAPORATOR COIL AND CONDENSER COIL SHALL BE LEAK TESTED. THE ASSEMBLED UNIT SHALL BE LEAK TESTED. A REMOVABLE, REVERSIBLE DOUBLE-SLOPED CONDENSATE DRAIN PAN WITH THROUGH THE BASE CONDENSATE DRAIN SHALL BE PIPED EXTERNALLY.
- .8 CONTROLS:
- .1 BUILDING BAS SHALL HAVE FULL CONTROLS OVER RTU (INCLUDING ERY SECTION) VIA BACNET MS/TP CONNECTIONS.
- .2 UNIT SHALL BE COMPLETELY FACTORY-WIRED WITH NECESSARY CONTROLS AND CONTACTOR PRESSURE LUGS OR TERMINAL BLOCK FOR POWER WIRING. UNIT SHALL PROVIDE AN EXTERNAL LOCATION FOR MOUNTING A FUSED DISCONNECT DEVICE. MICROPROCESSOR CONTROLS PROVIDE FOR ALL 24V CONTROL FUNCTIONS. THE RESIDENT CONTROL ALGORITHMS SHALL MAKE ALL HEATING, COOLING, AND/OR VENTILATING DECISIONS IN RESPONSE TO ELECTRONIC SIGNALS FROM SENSORS MEASURING INDOOR AND OUTDOOR TEMPERATURES. THE CONTROL ALGORITHM MAINTAINS ACCURATE TEMPERATURE CONTROL, MINIMIZES DRIFT FROM SETPOINT, AND PROVIDES BETTER BUILDING COMFORT. A CENTRALIZED MICROPROCESSOR SHALL PROVIDE ANTI-SHORT CYCLE TIMING AND TIME DELAY BETWEEN COMPRESSORS TO PROVIDE A HIGHER LEVEL OF MACHINE PROTECTION. 24-VOLT ELECTROMECHANICAL CONTROL CIRCUIT SHALL INCLUDE CONTACTOR TRANSFORMER AND CONTACTOR. INCORPORATE COMMUNICATION INTERFACE FOR BUILDING MANAGEMENT SYSTEM CONNECTIVITY.

.9 HIGH PRESSURE CONTROL:

- .1 ALL UNITS SHALL INCLUDE HIGH PRESSURE CUT-OUT AS STANDARD.
- .10 PHASE MONITOR:
- .1 PHASE MONITOR SHALL PROVIDE 100% PROTECTION FOR MOTORS AND COMPRESSORS AGAINST PROBLEMS CAUSED BY PHASE LOSS, PHASE IMBALANCE, AND PHASE REVERSAL. PHASE MONITOR IS EQUIPPED WITH AN LED THAT PROVIDES AN ON OR FAULT INDICATOR. THERE ARE NO FIELD ADJUSTMENTS. THE MODULE WILL AUTOMATICALLY RESET FROM A FAULT CONDITION.
- .11 ELECTRIC HEATERS:
- .1 HEAVY-DUTY NICKEL CHROMIUM CONSTRUCTION.
- .2 STAGING TO BE ACHIEVED BY CONTROLLER.
- .3 HEATERS ARE INDIVIDUALLY FUSED FROM FACTORY.
- .4 POWER ASSEMBLIES PROVIDE A SINGLE-POINT CONNECTION.
- .12 DRAIN PAN: REMOVABLE, DUAL-SLOPED DRAIN PAN.
- .13 FROSTAT: SAFETY MECHANISM, OPEN TO PREVENT FREEZING ON EVAPORATOR COIL. CLOSURES WHEN TEMPERATURE RISES TO 50°F.
- .14 CONVENIENCE OUTLET:
- .1 0°FOL, 120V/20AMP, 2 PLUG, CONVENIENCE OUTLET, THE CONVENIENCE OUTLET IS POWERED FROM THE LINE SIDE OF THE DISCONNECT OR CIRCUIT BREAKER.
- .15 ECONOMIZER:
- .1 THE ASSEMBLY INCLUDES FULLY MODULATING 0-100 PERCENT MOTOR AND DAMPERS, MINIMUM POSITION SETTING, PRESET LINKAGE, WIRING HARNESS WITH PLUG, SPRING RETURN ACTUATOR AND FIXED DRY BULB CONTROL. THE BAROMETRIC RELIEF SHALL PROVIDE A PRESSURE OPERATED DAMPER THAT SHALL BE GRAVITY CLOSING AND SHALL PROHIBIT ENTRANCE OF OUTSIDE AIR DURING THE EQUIPMENT OFF CYCLE.
- .16 THROUGH THE BASE ELECTRICAL WITH DISCONNECT SWITCH:
- .1 AN ELECTRICAL SERVICE ENTRANCE SHALL BE PROVIDED ALLOWING ELECTRICAL ACCESS FOR BOTH CONTROL AND MAIN POWER CONNECTIONS INSIDE THE CURB AND THROUGH THE BASE OF THE UNIT. OPTION SHALL ALLOW FOR FIELD INSTALLATION OF LIQUID-TIGHT CONDUIT AND AN EXTERNAL FIELD-INSTALLED DISCONNECT SWITCH.
- .2 THIS 3-POLE, MOLDED CASE, DISCONNECT SWITCH WITH PROVISIONS FOR THROUGH THE BASE ELECTRICAL CONNECTIONS. THE DISCONNECT SWITCH SHALL BE INSTALLED IN THE UNIT IN A WATER TIGHT ENCLOSURE WITH ACCESS THROUGH A SWINGING DOOR. WIRING SHALL BE PROVIDED FROM THE SWITCH TO THE UNIT HIGH VOLTAGE TERMINAL BLOCK. THE SWITCH SHALL BE UL/CSA AGENCY RECOGNIZED.
- .17 POWERED EXHAUST (BAROMETRIC RELIEF):
- .1 PROVIDE A FACTORY INSTALLED POWER EXHAUST ASSEMBLY THAT SHALL BE DESIGNED TO VENTILATE RETURN AIR TO ATMOSPHERE.
- .2 PLENUM MOUNTED DIRECT DRIVE ARFOIL DESIGN EXHAUST WHEEL MATERIAL SHALL BE HEAVY GAUGE ALUMINUM, WELDED CONSTRUCTION AND RATED FOR UP TO CLASS III SPEED/PRESSURE PERFORMANCE.
- .18 OUTDOOR AIR SECTION ENERGY RECOVERY:
- .1 GENERAL:

- .1 THE ENERGY RECOVERY CASSETTE SHALL INCORPORATE A ROTARY WHEEL IN AN INSULATED CASSETTE FRAME COMPLETE WITH REMOVABLE ENERGY TRANSFER MEDIA, SEALS, DRIVE MOTOR AND DRIVE BELT.
- .2 ENERGY RECOVERY WHEEL PERFORMANCE SHALL BE AHRI 1060 CERTIFIED AND BEAR THE AHRI CERTIFIED LABEL. COMPONENTS THAT ARE INDEPENDENTLY TESTED OR RATED IN ACCORDANCE WITH SHALL NOT BE ACCEPTABLE. MANUFACTURER MEMBERSHIP IN AHRI IS NOT AN ACCEPTABLE SUBSTITUTE. CERTIFIED COMPONENTS MUST BE LISTED AS ACTIVE IN THE AHRI DIRECTORY.
- .3 THE ENERGY RECOVERY CASSETTE SHALL BE AN UNDERWRITERS LABORATORY UR RECOGNIZED COMPONENT FOR FIRE AND ELECTRICAL SAFETY AND BEAR THE UR SYMBOL. RECOGNIZED COMPONENTS SHALL BE LISTED IN THE UL DIRECTORY.
- .4 THE ENERGY RECOVERY CASSETTE SHALL COMPLY WITH NFPA 90A BY VIRTUE OF UL STANDARD 1812 AND UL900 FIRE TEST FOR DETERMINATION OF FLAMMABILITY AND SMOKE DENSITY.
- .5 THE ENERGY RECOVERY CASSETTE SHALL CARRY A 5-YEAR STANDARD WARRANTY ON THE ENTIRE CASSETTE ASSEMBLY (EXCLUDING THE MOTOR) FROM THE DATE OF SHIPMENT. MOTORS SHALL CARRY THE MANUFACTURERS STANDARD 18 MONTH WARRANTY FROM THE DATE OF MANUFACTURE.
- .2 CASSETTE FRAME AND WHEEL CONSTRUCTION:
- .1 CASSETTE FRAME AND STRUCTURAL COMPONENTS SHALL BE CONSTRUCTED OF G90 GALVANIZED STEEL FOR CORROSION RESISTANCE.
- .2 WHEEL STRUCTURE SHALL CONSIST OF A WELDED HUB, SPOKE AND CONTINUOUS ROLLED RIM ASSEMBLY OF STAINLESS STEEL, AND SHALL BE SELF-SUPPORTING WITHOUT ENERGY TRANSFER SEGMENTS PRESENT.
- .3 WHEEL STRUCTURE SHALL BE CONNECTED TO THE SHAFT BY MEANS OF TAPER LOCK BUSHINGS.
- .4 WHEEL BEARINGS SHALL BE PERMANENTLY SEALED AND SELECTED FOR A MINIMUM 30 YEAR L-10 LIFE OF 40,000 HOURS. BEARINGS REQUIRING EXTERNAL GREASE FITTINGS OR PERIODIC MAINTENANCE ARE NOT ACCEPTABLE.
- .5 STANDARD CASSETTE MAY BE AFFIXED WITHIN THE CABINET IN ANY ORIENTATION WITHOUT THE NEED FOR FACTORY MODIFICATION.
- .3 ENERGY TRANSFER MEDIA:
- .1 ENERGY TRANSFER MEDIA SHALL BE CONSTRUCTED OF A DURABLE SYNTHETIC LIGHTWEIGHT POLYMER.
- .2 MEDIA SHALL BE BOUND CONTINUOUSLY WITH ONE FLAT AND ONE STRUCTURAL LAYER IN AN IDEAL PARALLEL PLATE GEOMETRY. AIRFLOW ACROSS HEAT EXCHANGER SURFACE SHALL REMAIN LAMINAR.
- .3 ENERGY TRANSFER MEDIA SHALL NOT EXCEED 3" IN DEPTH.
- .4 ENERGY TRANSFER MEDIA SHALL BE SUITABLE FOR USE IN CORROSIVE, MARINE OR COASTAL ENVIRONMENTS WITHOUT THE NEED FOR ADDITIONAL COATINGS.
- .5 SENSIBLE ONLY ENERGY TRANSFER MEDIA SHALL BE CONSTRUCTED IN THE SAME FASHION AS THE ENTHALPY TRANSFER MEDIA WITH THE EXCEPTION OF THE DESICCANT COATING PROCESS REQUIRED FOR ENTHALPY WHEELS.
- .4 COATINGS AND DESICCANT:
- .1 DESICCANT SHALL BE EITHER SILICA GEL OR MOLECULAR SIEVE AND PERMANENTLY BONDED TO THE ENERGY TRANSFER MEDIA WITHOUT THE USE OF BINDERS OR ADHESIVES, WHICH MAY DEGRADE DESICCANT PERFORMANCE. DESICCANTS NOT PERMANENTLY BONDED ARE NOT ACCEPTABLE DUE TO POTENTIAL DELAMINATION OR EROSION OF THE DESICCANT FROM THE ENERGY TRANSFER MEDIA.
- .2 DESICCANT SHALL BE NON-MIGRATING NOR SHALL IT DISSOLVE OR DELIQUESCCE IN THE PRESENCE OF WATER OR HIGH HUMIDITY.
- .3 ENERGY TRANSFER MEDIA SHALL BE CAPABLE OF REPEATED WASHINGS WITHOUT SIGNIFICANT DEGRADATION OF THE DESICCANT BOND AS DOCUMENTED BY AN INDEPENDENT THIRD PARTY.
- .5 REMOVABLE ENERGY TRANSFER SEGMENTS:
- .1 WHEELS 25" IN DIAMETER AND GREATER SHALL BE PROVIDED WITH REMOVABLE ENERGY TRANSFER SEGMENTS. SEGMENTS SHALL BE REMOVABLE WITHOUT THE USE OF TOOLS TO FACILITATE MAINTENANCE AND CLEANING.
- .6 DRIVE SYSTEM:
- .1 WHEEL DRIVE MOTOR SHALL BE AN UNDERWRITERS LABORATORY RECOGNIZED COMPONENT AND SHALL BE MOUNTED IN THE CASSETTE FRAME AND SUPPLIED WITH A SERVICE CONNECTOR OR JUNCTION BOX.
- .2 THREE PHASE MOTORS SHALL BE SUITABLE FOR USE IN BOTH STANDARD AND INVERTER RATED APPLICATIONS.
- .3 SHALL NOT REQUIRE PERIODIC ADJUSTMENT.

- .19 BUILT-IN REFRIGERANT DETECTION SYSTEM WITH INTEGRATED SENSORS PROVIDING R-454B LEAK DETECTION. SYSTEM AUTOMATICALLY STARTS A SEQUENCE TO DILUTE REFRIGERANT GAS AS WELL AS RASING AN ALARM WHEN IT SENSES THE PRESENCE OF REFRIGERANT IN THE CABINET.
- .20 CURB: INSULATED, 600MM HIGH, SEISMICALLY RESTRAINED CURB.
- .21 ACCEPTABLE MATERIAL: TRANE, AAO, YORK, CARRIER & ENGINEERED AIR AND LENOX.

17. GRILLES, REGISTERS AND DIFFUSER:

- .1 GENERAL:
- .1 TO MEET CAPACITY, PRESSURE DROP, TERMINAL VELOCITY, NOISE LEVEL, NECK VELOCITY AS INDICATED.
- .2 FRAMES:
- .1 FULL PERIMETER GASKETS.
- .2 PLASTER FRAMES WHERE SET INTO PLASTER OR GYPSUM BOARD AND AS SPECIFIED.
- .3 CONCEALED FASTENERS
- .3 CONCEALED OPERATORS
- .4 ACCEPTABLE MANUFACTURER: E.H. PRICE, NAILOR, TITUS, KRUEGER, METALARE.
- .2 GRILLES:
- .1 TYPE SG1: STEEL CONSTRUCTION, DOUBLE DEFLECTION, HORIZONTAL FACE BARS, OFF-WHITE BAKED ENAMEL FINISH. SIZE: AS INDICATED.
- ACCEPTABLE MATERIAL: E.H. PRICE MODEL 520 OR EQUAL.
- .2 TYPE EG1: STEEL CONSTRUCTION, 45° DEFLECTION, FIXED LOUVRES, 20 MM (3/4") SPACING, OFF-WHITE BAKED ENAMEL FINISH. COMPLETE WITH BALANCING DAMPER, SIZE AS INDICATED.
- ACCEPTABLE MATERIAL: E.H. PRICE MODEL 5300 OR EQUAL.

18. TESTING, ADJUSTING AND BALANCING (TAB):

- .1 GENERAL:
- .1 TAB MEANS TO TEST, ADJUST AND BALANCE TO PERFORM IN ACCORDANCE WITH REQUIREMENTS OF CONTRACT DOCUMENTS AND TO DO ALL OTHER WORK AS SPECIFIED IN THIS SECTION.
- .2 DO TAB TO FOLLOWING TOLERANCES OF DESIGN VALUES:
- .1 HVAC SYSTEMS: PLUS OR MINUS 5%.
- .3 ADJUST OR REPLACE SHEAVES AS REQUIRED TO MEET DESIGN PERFORMANCE.
- .4 DO TAB OF COMPLETE MECHANICAL SYSTEMS OVER ENTIRE OPERATING RANGE IN ACCORDANCE WITH MOST STRINGENT CONDITIONS OF AABC (ASSOCIATED AIR BALANCE COUNCIL) & NABC (NATIONAL AIR BALANCE COUNCIL).
- .5 FOR ALL ADJUSTABLE DIFFUSERS/GRILLES: ADJUST AIR PATTERN TO ENSURE PROPER AIR DISTRIBUTION AND TO AVOID DUMPING. AIR VELOCITY SHALL NOT EXCEED 0.25 M/S (50 FPM) IN THE OCCUPIED ZONE (OR AS DIRECTED BY ENGINEER).
- .2 TAB REPORT:
- .1 FORMAT TO BE IN ACCORDANCE WITH ASSOCIATED AIR BALANCING COUNCIL (AABC/CAMC).
- .3 SYSTEMS:
- .1 AIR SYSTEMS:
- .1 INCLUDE BOTH SPECIFIED AND MEASURED DATA:
- .1 AIRFLOWS
- .2 OPERATING PRESSURES
- .3 DUCT SIZE & TRANSVERSE READINGS
- .4 MOTOR VOLTS, AMPS & POWER
- .2 FOR THE FOLLOWING EQUIPMENT:
- .1 RTU
- .2 EXHAUST FANS
- .3 EXHAUST DUCTWORK
- .4 SUPPLY DUCTWORK
- .5 GRILLES
- .4 VERIFICATION:
- .1 ALL REPORTED RESULTS SUBJECT TO VERIFICATION BY ENGINEER.
- .2 PROVIDE MANPOWER AND INSTRUMENTATION TO VERIFY UP TO 30% OF ALL REPORTED RESULTS.
- .3 NUMBER AND LOCATION OF VERIFIED RESULTS TO BE AT DISCRETION OF ENGINEER.
- .4 BEAR COSTS TO REPEAT TAB AS REQUIRED TO SATISFACTION OF ENGINEER.
- .5 PROVIDE "AS-BUILT" FULL SYSTEM SCHEMATICS. USE AS-BUILT DRAWINGS FOR REFERENCE.
- .6 TAB TO BE CONSIDERED COMPLETE ONLY WHEN FINAL TAB REPORT RECEIVED AND APPROVED BY ENGINEER.

19. DDC CONTROLS:

- .1 ALL 24VDC (LOW VOLTAGE) CONTROLS BY CONTROLS CONTRACTOR.
- .2 PROVIDE EMT CONDUIT 1/2" STEEL COUPLINGS AND FITTINGS FOR CONTROL WIRING IN EXPOSED OR EXTERIOR LOCATIONS. REFER TO ELECTRICAL SPECIFICATIONS FOR INSTALLATION DETAILS.
- .3 PROVIDE FT-6 FIRE RATED CABLE FOR CONTROL WIRING IN CONCEALED AREAS.
- .4 PROVIDE DDC CONTROLLER AS REQUIRED FOR ANY NEW ADDED EQUIPMENT.
- .5 THE DDC & HVAC MECHANICAL EQUIPMENT CONTROLLERS SHALL RESIDE ON THE BUILDING LEVEL NETWORK.
- .6 DDC & HVAC MECHANICAL EQUIPMENT CONTROLLERS SHALL USE THE SAME PROGRAMMING LANGUAGE AND TOOLS. DDC & HVAC MECHANICAL EQUIPMENT CONTROLLERS WHICH REQUIRE DIFFERENT PROGRAMMING LANGUAGE OR TOOLS ON A NETWORK ARE NOT ACCEPTABLE.
- .7 ALL CONTROLS SHALL MATCH BASE BUILDING STANDARDS.
- .8 CONTROLS CONTRACTOR SHALL ASSIST BALANCING CONTRACTOR DURING BALANCING ACTIVITIES.
- .9 ACCEPTABLE CONTROL CONTRACTORS: AINSWORTH, AIRON, BLINDLY MECHANICAL, HONEYWELL, REGULVAR AND TRANE.

20. COMMISSIONING:

- .1 GENERAL:
- .1 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FUNCTIONAL PERFORMANCE TESTS. THESE TESTS ENSURE THAT ALL EQUIPMENT AND SYSTEMS OPERATE IN ACCORDANCE WITH DESIGN INTENT. THE TESTS ARE DYNAMIC TESTS, AND TEST THE SYSTEMS THROUGH ALL POSSIBLE MODES OF OPERATION.
- .2 IN THE FUNCTIONAL PERFORMANCE TESTS, ALL HVAC MECHANICAL SYSTEMS (INCLUDING CONTROL SYSTEMS) AND ELECTRICAL SYSTEMS SHALL BE CHECKED FOR THE FOLLOWING:
- .1 VERIFY THAT EACH SYSTEM AND SUB-SYSTEM IS OPERATING.
- .2 COMPLY WITH CONTRACT SPECIFICATIONS AND THE DESIGN INTENT DOCUMENT THROUGH THE ENTIRE RANGE OF OPERATING CONDITIONS.
- .3 RE-TESTING OF CORRECTED ITEMS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- .4 DEFICIENCIES IN SYSTEM, SUB-SYSTEM, OR ELEMENT PERFORMANCE WILL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER. DEFICIENCIES WILL BE RESOLVED ON A CASE-BY-CASE BASIS.
- .2 FUNCTIONAL PERFORMANCE TEST:
- .1 THE CONTRACTOR SHALL PERFORM FUNCTIONAL PERFORMANCE TESTING. THE CONTRACTOR SHALL MAINTAIN AN EQUIPMENT AND SYSTEM CHECKLIST TO TRACK PROGRESS SO IT CAN BE USED TO SCHEDULE START-UPS AND TESTING.
- .1 EQUIPMENT CHECKLIST & SYSTEM CHECKLIST:
- .1 EXHAUST FANS
- .2 RTU
- .3 CONTROLS/BUILDING AUTOMATION
- .3 DEFICIENCY RESOLUTION FOR SYSTEM COMMISSIONING:
- .1 IF ACCEPTABLE PERFORMANCE CANNOT BE ACHIEVED, THEN THE NECESSARY CORRECTIVE MEASURES SHALL BE CARRIED OUT. THE ENGINEER AND/OR CONTRACTOR WILL ISSUE APPROPRIATE DIRECTIONS IN THIS REGARD.
- .2 THE ALLOCATION OF COST OF DEFICIENCY RESOLUTION SHALL BE DETERMINED BY THE CONSTRUCTION MANAGER AND ENGINEER, ON A CASE-BY-CASE BASIS.

RTU-1 CONTROLS:

GENERAL:

THIS SYSTEM CONSISTS OF A SINGLE ROOFTOP UNIT (ELECTRIC HEATING & DX COOLING) THAT SERVICES THE GYM. THE UNIT IS PROVIDED WITH AN ENERGY RECOVERY WHEEL AND VFD ON EACH THE SUPPLY AND EXHAUST FANS OF THE UNIT. THE UNIT IS INTENDED TO OPERATE AS A CONSTANT VOLUME UNIT. SPECIFIC CONTROL STRATEGY IS LISTED IN THE SEQUENCE OF OPERATION.

THE UNIT IS PROVIDED WITH AN ENTHALPY TYPE ECONOMIZER AND ENERGY WHEEL FOR PREHEATING OR PRECOOLING THE OUTDOOR AIR DURING MINIMUM OUTDOOR AIR CONDITIONS. OUTDOOR AIR SHALL BE BASED ON DEMAND CONTROL VENTILATION THROUGH COMBINATION ROOM TEMPERATURE/CO2 SENSORS. SHOULD THE OUTDOOR AIR DAMPER BE CALLED TO OPEN DUE TO HIGH LEVELS OF CO2, THE ENERGY WHEEL WOULD CONTINUE TO OPERATE. IF THE OUTDOOR AIR DAMPER WERE REQUESTED TO OPEN TO SATISFY THE ECONOMIZER OPERATION, THE ENERGY WHEEL WOULD SHUT OFF.

COOLING SHALL BE LOCKED OUT WHEN THE OAT IS BELOW 13 DEG. C (ADJUSTABLE) OR IF THE COOLING FLAG IS OFF. HEATING SHALL BE LOCKED OUT WHEN THE OAD IS ABOVE 18 DEG. C (ADJUSTABLE) OR IF THE HEATING FLAG IS OFF.

DURING THE OCCUPIED MODE, THE ROOFTOP UNIT SHALL OPERATE TO MAINTAIN THE ROOM TEMPERATURE PER THE SEQUENCE BELOW. IN THE HEATING MODE, THE ROOFTOP FIRST ELECTRIC HEATING COIL SHALL OPERATE AS THE FIRST STAGE OF HEAT AND BE SUPPLEMENTED BY SECOND ELECTRIC HEATING COIL AS A SECOND STAGE IF UNABLE TO PROVIDE SUFFICIENT HEAT (I.E. SAT CANNOT BE MAINTAINED).

DURING UNOCCUPIED TIMES THE UNIT WILL GENERALLY BE OFF (ABOVE AN OAT OF -10 DEG. C (ADJUSTABLE)) AND IF BELOW -10 DEG. C, ONLY ENERGIZE AT 75% THE SUPPLY FAN CAPACITY WITH HEATING TO MAINTAIN UNOCCUPIED SETPOINTS OF 16 DEG. C IN THE WINTER. THE SUMMER UNOCCUPIED SETBACK SHALL BE 27 DEG. C. DURING UNOCCUPIED HOURS, THE OA DAMPER WILL BE CLOSED AND RETURN DAMPER FULLY OPEN.

SEQUENCE OF OPERATION:

1. THE ROOFTOP UNIT SHALL BE ENABLED & DISABLED VIA EMCS. THE SUPPLY & EXHAUST FANS AND ENERGY WHEEL SHALL BE ENABLED TO RUN ON EMCS COMMAND. IN THE UNOCCUPIED MODE, THE UNIT SHALL BE OFF IF THE OAT IS GREATER THAN -10 DEG. C (ADJUSTABLE) AND ONLY ENERGIZE TO MAINTAIN THE UNOCCUPIED SETBACK TEMPERATURES OF 16 DEG. C IN THE WINTER AND 27 DEG. C IN THE SUMMER. IF THE OAT IS -10 DEG. C OR LESS, THE UNIT SHALL RUN IN THE RECIRCULATED MODE WITH THE SUPPLY FAN RUNNING AT 75% TO MAINTAIN THE SETBACK TEMPERATURES. IN THE OCCUPIED MODE, THE EMCS SHALL SCHEDULE THE MORNING WARM UP AND THEN OPERATE AS NOTED IN ITEM 4 BELOW.
2. THE EMCS SHALL RESET THE SUPPLY AIR TEMPERATURE SETPOINT OF THE RTU BASED ON THE SPACE TEMPERATURE OF THE ZONE. THE RESET SCHEDULE SHALL BE PER ITEM 10 BELOW.
3. WHEN THE OUTDOOR AIR CONDITIONS (ENTHALPY BASED) ARE SUITABLE TO PROVIDE THE REQUIRED SUPPLY AIR TEMPERATURE SETPOINT, THE OUTDOOR AIR DAMPER SHALL BE MODULATED BETWEEN MINIMUM POSITION AND FULL OPEN IN ORDER TO SATISFY THE TEMPERATURE SETPOINT. ENERGY WHEEL OPERATION SHALL BE DISABLED. MINIMUM OUTDOOR AIR DAMPER POSITION (USING ADJUSTABLE) SHALL BE CALCULATED BASED UPON SUPPLYING THE SCHEDULED MINIMUM OUTSIDE AIR VOLUME FLOW RATE (1000 CFM). THE OUTSIDE AIR DAMPER SHALL CLOSE IF ANY OF THE FOLLOWING CONDITIONS EXIST:
- 3.1 THE SUPPLY FAN IS OFF.
- 3.2 NIGHT SET BACK OPERATION.
- 3.3 MORNING WARM UP OPERATION.
4. DURING MORNING WARM-UP, THE RTU SHALL BE ENABLED AT 6AM (ADJUSTABLE). ECONOMIZER TO REMAIN CLOSED AND HEATING SHALL BE ENABLED TO ACHIEVE A RETURN AIR TEMPERATURE OF 20 DEG. C (ADJUSTABLE) VIA THE ROOFTOP UNIT ONLY. ONCE THE AVERAGE ROOM TEMPERATURE SETPOINT HAS BEEN REACHED, THE UNIT SHALL GO INTO THE OCCUPIED MODE WITH THE OAD OPENING TO ITS MINIMUM POSITION.
5. THE ENERGY WHEEL SHALL BE ENABLED & DISABLED VIA EMCS IF DEEMED NECESSARY TO MAINTAIN TEMPERATURE CONDITIONS (I.E. NOT OPERATE IN ECONOMIZER MODE). ENERGY WHEEL DEFROST CYCLE SHALL BE INTERNALLY CONTROLLED & WIRED BY THE UNIT MANUFACTURER.
6. THE EMCS SHALL ADJUST THE OUTDOOR AIR DAMPER MINIMUM POSITION TO MAINTAIN THE ROOM CO2 SETPOINT (INITIALLY SET TO 1000 PPM BUT ADJUSTABLE) DURING THE OCCUPIED MODE OF OPERATION. IF THE CO2 MODE IS ACTIVATED, THE ENERGY WHEEL SHALL CONTINUE TO OPERATE AND NOT INTERPRET THE OAD OPENING AS A MODE OF ECONOMIZER.
7. WHEN THE ECONOMIZER IS UNABLE TO SATISFY THE SUPPLY AIR TEMPERATURE SET POINT PER ITEM 10 BELOW, THE ECONOMIZER SHALL MOVE TO ITS MINIMUM POSITION AND MECHANICAL COOLING SHALL BE ENABLED WHEN THE OUTSIDE AIR TEMPERATURE (OAT) IS ABOVE THE COOLING LOCK OUT TEMPERATURE OF 13 DEG. C (ADJUSTABLE) AND THE COOLING FLAG IS ON. MECHANICAL COOLING SHALL CONSIST OF STAGE 1 ---50% CAPACITY WITH A PART STAGE UNLOADER AND STAGE 2 ---100% CAPACITY. COOLING STAGES 1& 2 SHALL BE ENABLED BY THE EMCS. THE EMCS SHALL ALWAYS UTILIZE STAGE 1 AS THE LEAD BUT UTILIZE A PID LOOP TO CYCLE THE SECOND STAGE OF COOLING. ANY HEATING SHALL BE LOCKED OUT DURING THE COOLING SEASON. THE ENERGY WHEEL SHALL REMAIN ENERGIZED. THE COOLING SHALL BE DISABLED IF ANY OF THE FOLLOWING CONDITIONS EXIST.
- 7.1 THE SUPPLY FAN IS OFF.
- 7.2 ECONOMIZER HAS NOT BEEN FULLY UTILIZED.
- 7.3 OAT IS BELOW LOCK OUT TEMPERATURE.
8. DURING THE HEATING SEASON, THE RTU HEATING SHALL BE THE PRIMARY HEATING SOURCE. THE SUPPLY AIR TEMPERATURE SHALL BE RESET BASED ON ITEM 10 BELOW. HEATING SHALL BE PROVIDED VIA THE ELECTRIC HEATING COILS OPERATION WITHIN THE UNIT. IF THE OAT IS 15 DEG. C OR LOWER, AND THERE IS A CALL FOR HEAT, THE RTU HEATING OPERATION SHALL MAINTAIN THE UNIT SAT SETPOINT. WHILE OCCUPIED, SAT TO BE SET TO MAINTAIN AVERAGE SPACE TEMPERATURE SETPOINT OF 21.5 DEG. C (71 DEG. F).
9. THE EMCS SHALL ENERGIZE THE RTU EXHAUST FAN AND SHALL CONTROL THE RTU EXHAUST FAN TO MAINTAIN THE DP SETPOINT (TYPICALLY 5-12 PA POSITIVE PRESSURE).
10. THE SUPPLY AIR SETPOINT SHALL BE RESET AS FOLLOWS BASED ON IF THE HEATING OR COOLING FLAG IS ENERGIZED (ALL SETPOINTS ADJUSTABLE).
- 9.1 WINTER:
- 9.1.1 RMT 75 DEG F (24 DEG. C) / SAT 65 DEG F (18 DEG. C)
- 9.1.2 RMT 68 DEG F (20 DEG. C) / SAT 95 DEG F (35 DEG. C)
- 9.2 SUMMER:
- 9.2.1 RMT 74 DEG F (23.3 DEG. C) / SAT 57 DEG F (14 DEG. C)
- 9.1.2 RMT 70 DEG F (21.1 DEG. C) / SAT 62 DEG F (18 DEG. C)

11. THE EMCS SHALL MONITOR SUPPLY FAN STATUS, EXHAUST FAN STATUS, AND DAMPER POSITIONS.
12. EMCS TO ALARM E/F/SF -- VFD FAULT/FAILURE AND FILTER PRESSURE SWITCH AND ANNUNCIATE AT THE OWS.
13. EMCS TO MONITOR DUCT STATIC PRESSURE.



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2026-03-20	ISSUED FOR 66%		--
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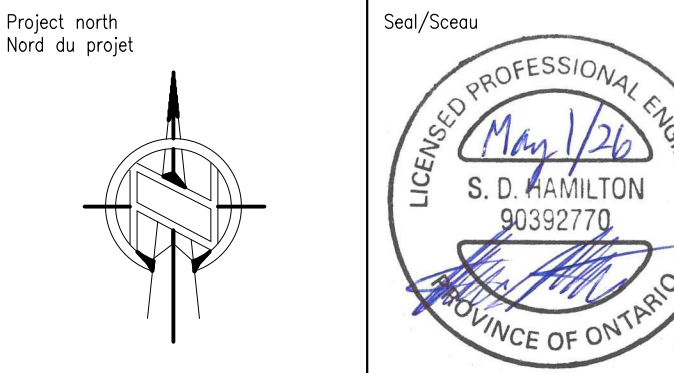
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Project/Projet

FRONT OF YONGE PUBLIC SCHOOL - ARCHITECTURAL SERVICES

Drawing title/Titre du dessin

MECHANICAL SPECIFICATIONS & RTU CONTROLS

Scale
Échelle
Design by
Conçu par
Drawn by
Dessiné par
Reviewed by
Examiné par

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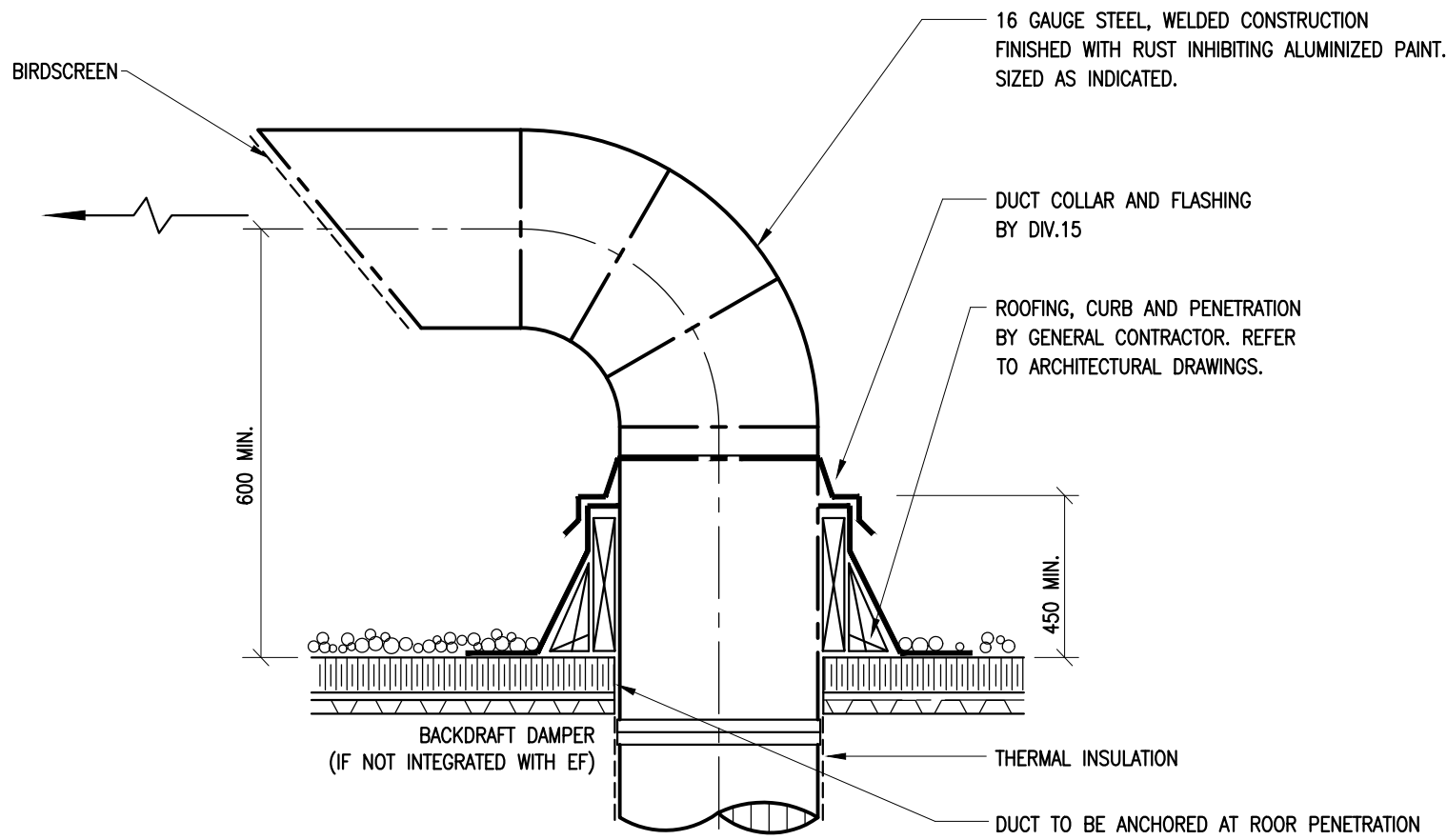
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Drawing/Dessin

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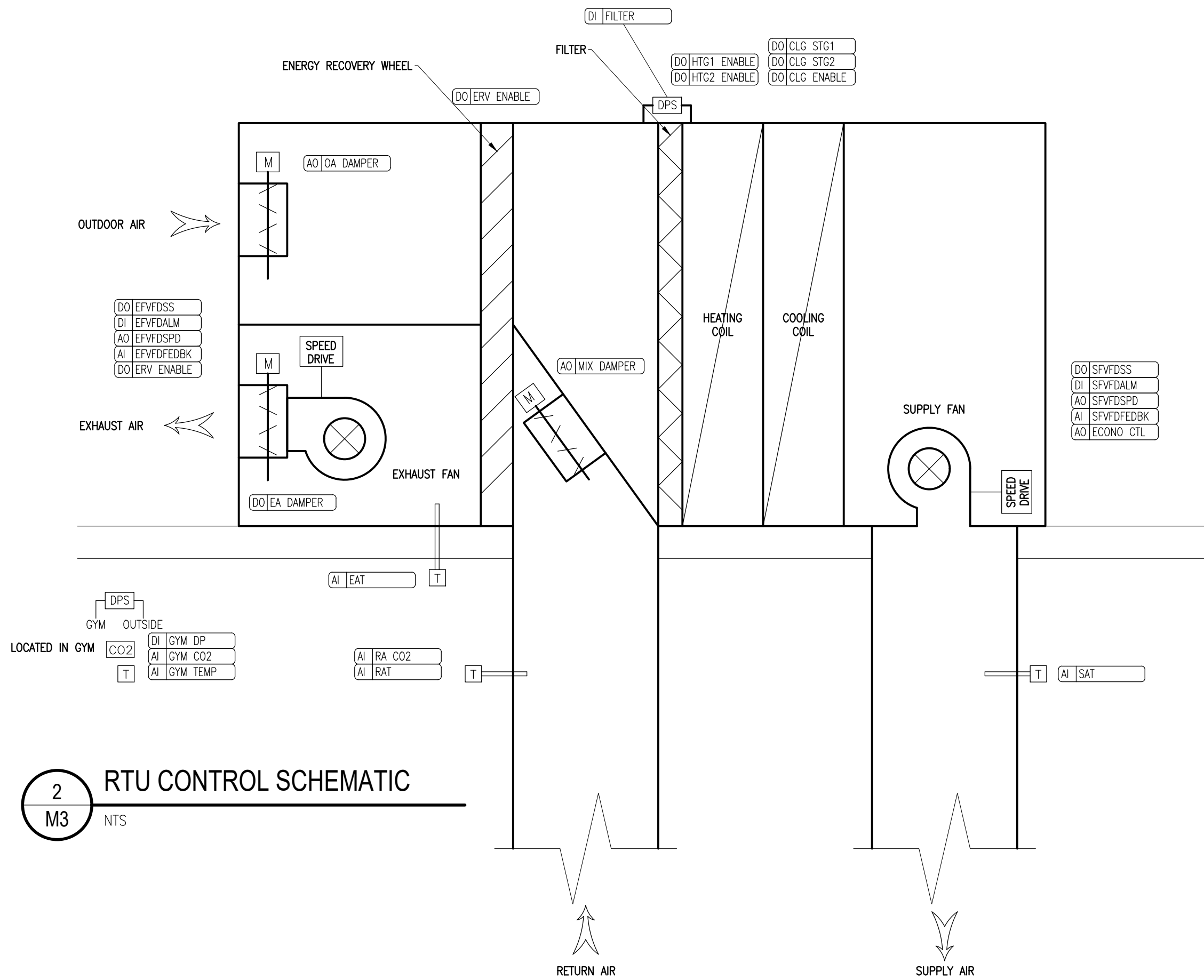
of 7



W/R EF-6, EF-7, & EF-8 ROOF PENETRATION DETAILS

1
M3

NTS



RTU CONTROL SCHEMATIC

2
M3

NTS

FAN SCHEDULE

TAG	LOCATION	FUNCTION	FAN DATA						ELECTRICAL DATA		BASIS OF DESIGN	REMARKS
			TYPE	DRIVE (BELT/DIRECT)	AIR FLOW (L/s)	ESP (Pa)	FAN SPEED (RPM)	SONES	MOTOR SIZE (HP)	V/PH/Hz		
EF-6	W/R B05	EXHAUST	CEILING EXHAUST	DIRECT	55	63	880	1.1	1/100	115/60/1	GREENHECK SP-AP0511W	C/W BACK DRAFT DAMPER.
EF-7	EAST COURT W/R	EXHAUST	CEILING EXHAUST	DIRECT	37	63	817	0.9	1/100	115/60/1	GREENHECK SP-AP0511W	C/W BACK DRAFT DAMPER.
EF-8	WEST COURT W/R	EXHAUST	CEILING EXHAUST	DIRECT	37	63	817	0.9	1/100	115/60/1	GREENHECK SP-AP0511W	C/W BACK DRAFT DAMPER.

NOTES:
1. FOR DETAILS REFER TO SPECIFICATIONS.
2. CONTRACTOR TO VERIFY FEASIBILITY OF CONNECTION TO NEW DUCTWORK PRIOR TO ORDER NEW FANS.
3. DISCONNECT SWITCH BY DIV. 26.
4. SPEED SWITCHES SHALL BE SUPPLIED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR.

PLUMBING FIXTURE SCHEDULE

TAG	DOMESTIC COLD WATER (øMM)	DOMESTIC HOT WATER (øMM)	SANITARY (øMM)	FIXTURE TYPE (WALL MOUNTED, UNDER-MOUNT, FLOOR MOUNTED)	LOCATION	FIXTURE MANUFACTURER & MODEL	FINISH	BARRIER-FREE (YES/NO)	CONTROL TYPE (LEVER, WRIST BLADE, SENSOR, PADDLE, HARDWARE/BATTERY)	FLOW RATE (LPM/LPF)	TRIM MANUFACTURER & MODEL	ACCESSORIES	NOTES
LAV1	13	13	40	WALL MOUNTED BARRIER-FREE LAVATORY & FAUCET	W/R 124	AMERICAN STANDARD: MURRO 0955001EC	WHITE	YES	LEVER	4.5	FAUCET: AMERICAN STANDARD COLONY 7075100.002 SHROUD: AMERICAN STANDARD 0059.020EC	CARRIER: WATTS CA-411	BOWL: VITREOUS CHINA, EVERCLEAN ANTIMICROBIAL SURFACE, SINGLE HOLE CENTERSET, REAR OVERFLOW, WITH FAUCET LEDGE. OVERALL DIMENSION: 520 x 560 x 127 MM. FAUCET: COUNTER MOUNTED, SINGLE HANDLE, POLISHED CHROME FINISH, LEAD FREE AND METAL BODY, 610MM BRAIDED FLEX SUPPLY HOSE WITH 10 MM COMPRESSION CONNECTIONS, CERAMIC DISC CARTRIDGE, PRESSURE COMPENSATING AERATOR, METAL POP-UP DRAIN, HOT LIMIT SAFETY STOP.
WC1	13	-	75	FLOOR MOUNTED BARRIER-FREE WATER CLOSET	W/R 124	AMERICAN STANDARD: CADET FLOWISE 2467601.020	WHITE	YES	LEVER	4.2	SEAT: CENTOCO 1500 STSCCSS-001	-	TANK TYPE TOILET, FLOOR OUTLET, VITREOUS CHINA, EVERCLEAN ANTIMICROBIAL SURFACE, ELONGATED BOWL, RIGHT HEIGHT RIM AT 419MM, SIPHON JET FLUSH ACTION, PRESSURE-ASSISTED FLUSH.
FD1	-	-	75	ROUND FLOOR DRAIN	AS INDICATED	WATTS: FD-100	NICKEL BRONZE	-	-	-	-	TAP PRIMER, C/W SEDIMENT BUCKET	STANDARD DUTY FLOOR DRAIN, ADJUSTABLE, CAST IRON BODY, ROUND, 125mmø NICKEL BRONZE STRAINER, AND TRAP PRIMING CONNECTION. PROVIDE MEMBRANE CLAMP TO MATCH FLOORING.

NOTES: 1. COORDINATE EXACT PIPING LOCATIONS ON SITE.
2. VENT TO MEET OBC REQUIREMENTS, VENTING THROUGH SLOPED ROOFS NOT PERMITTED.
3. ALL SINKS IDENTIFIED AS BUILT-IN BASINS BY GENERAL TRADES. ALL OTHER ASSOCIATED ACCESSORIES AND TRIM BY MECHANICAL. ALL PIPEWORK TO BE INSTALLED NEATLY AND COORDINATED WITH ALL OTHER TRADES.
4. ALTERNATIVE MANUFACTURERS & MODEL NUMBERS SHALL NOT BE ACCEPTED.
5. MINIMUM UNDERGROUND SANITARY PIPING SIZE TO BE 50ø.
6. INSTALLATION OF BARRIER FREE FIXTURES SHALL COMPLY WITH BARRIER FREE REQUIREMENTS OF OBC.
7. FOR BARRIER FREE SINKS & LAVATORIES, INSULATE DOMESTIC HOT WATER AND DRAIN PIPING UNDER COUNTER. SEE ARCH. DWG FOR DETAILS. ACCEPTABLE MATERIAL: SKALLGUARD WHITE OR MINERAL FIBRE WITH WHITE PVC JACKET.
8. ALL FLOOR DRAINS SHALL BE TRAPPED AND PRIMED.

ROOFTOP UNIT SCHEDULE WITH HEAT RECOVERY

ROOFTOP UNIT SCHEDULE WITH HEAT RECOVERY																																		
TAG	LOCATION	AREA SERVED	SUPPLY FAN DATA (VSD)				EXHAUST/RETURN FAN DATA (VSD)				ELECTRIC HEATING SECTION				DX COOLING COIL DATA						ENERGY WHEEL DATA						ELECTRICAL DATA		BASIS OF DESIGN	REMARKS				
			FAN TYPE	AIR FLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)	TOTAL STATIC PRESSURE (Pa)	MOTOR SIZE (HP)	FAN TYPE	AIR FLOW (L/s)	EXTERNAL STATIC PRESSURE (Pa)	TOTAL STATIC PRESSURE (Pa)	MOTOR SIZE (HP)	CAPACITY (kW)	E.A.T. (°C)	L.A.T. (°C)	STAGES	TOTAL CAPACITY (kW)	SENSIBLE CAPACITY (kW)	E.A.T. (DB/WB) (°C)	L.A.T. (DB/WB) (°C)	STAGES	HOT GAS REHEAT (YES/NO)	WHEEL AIR FLOW (L/s)	SUMMER			WINTER				FLA/MCA/MOC	V/PH/Hz		
																								TOTAL CAPACITY (kW)	SENSIBLE CAPACITY (kW)	L.A.T. (°C)	EFFICIENCY (%)	TOTAL CAPACITY (kW)					L.A.T. (°C)	EFFICIENCY (%)
RTU1	ROOF	GYM	BC PLENUM	945	407.5	415	3	BC PLENUM	472	-	225	1	27	17.8	40.9	2	17	13.4	24.8/17.5	12.4/11.7	2	NO	472	-	11.6	24.8	81	14.8	17.8	79	-/84/90	208/3/60	TRANE THK060	C/W SYMBIO 700 CONTROLLER
<div>NOTES: 1. FOR DETAILS REFER TO SPECIFICATIONS. 2. MANUFACTURER NAME & MODEL NUMBER REPRESENTS ACCEPTABLE QUALITY STANDARD ONLY. ALTERNATIVE MATERIALS MAY BE APPROVED AFTER REVIEW OF TECHNICAL INFORMATION BY ENGINEER. 3. TYPICAL ENERGY WHEEL CONDITIONS: SUMMER - E.A.T. SHALL BE 35°C/23.9°C WINTER - E.A.T. SHALL BE -27.2°C</div>																																		



Client

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Project north
Nord du projet

Seal/Scelu

FRONT OF YONGE PUBLIC SCHOOL - ARCHITECTURAL SERVICES

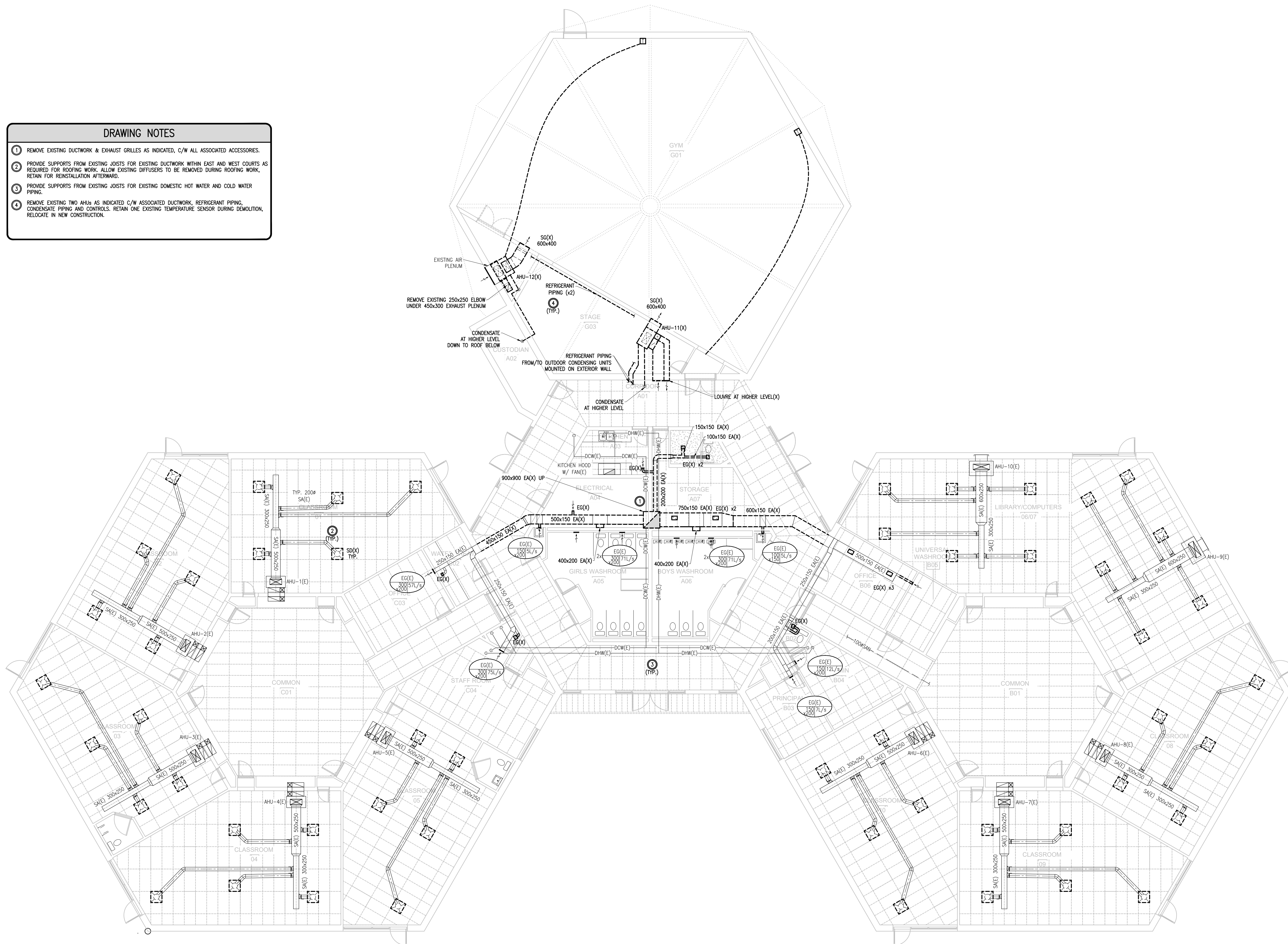
DETAILS & SCHEDULES

Scale Échelle	AS NOTED	Project no./No. du projet 2026-140
Design by Conçu par	J. CHENG	Drawing/Desin
Drawn by Dessiné par	Z. BO	M3
Reviewed by Examiné par	S. HAMILTON	of 7

Client

DRAWING NOTES

- 1 REMOVE EXISTING DUCTWORK & EXHAUST GRILLES AS INDICATED, C/W ALL ASSOCIATED ACCESSORIES.
- 2 PROVIDE SUPPORTS FROM EXISTING JOISTS FOR EXISTING DUCTWORK WITHIN EAST AND WEST COURTS AS REQUIRED FOR ROOFING WORK. ALLOW EXISTING DIFFUSERS TO BE REMOVED DURING ROOFING WORK, RETAIN FOR REINSTALLATION AFTERWARD.
- 3 PROVIDE SUPPORTS FROM EXISTING JOISTS FOR EXISTING DOMESTIC HOT WATER AND COLD WATER PIPING.
- 4 REMOVE EXISTING TWO AHUs AS INDICATED C/W ASSOCIATED DUCTWORK, REFRIGERANT PIPING, CONDENSATE PIPING AND CONTROLS. RETAIN ONE EXISTING TEMPERATURE SENSOR DURING DEMOLITION, RELOCATE IN NEW CONSTRUCTION.



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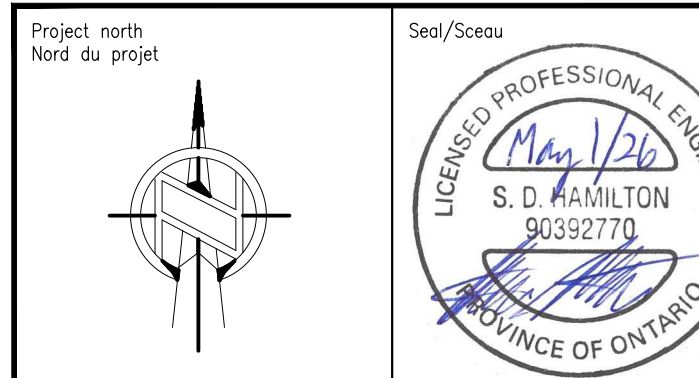
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Project/Projet
**FRONT OF YONGE PUBLIC
SCHOOL - ARCHITECTURAL
SERVICES**

Drawing title/Titre du dessin
**MECHANICAL
DEMOLITION
GROUND FLOOR**

Scale Échelle	AS NOTED	Project no./No. du projet 2026-140
Design by Conçu par	J. CHENG	Drawing/Dessin
Drawn by Dessiné par	Z. BO	M4
Reviewed by Examiné par	S. HAMILTON	

OF 7

1

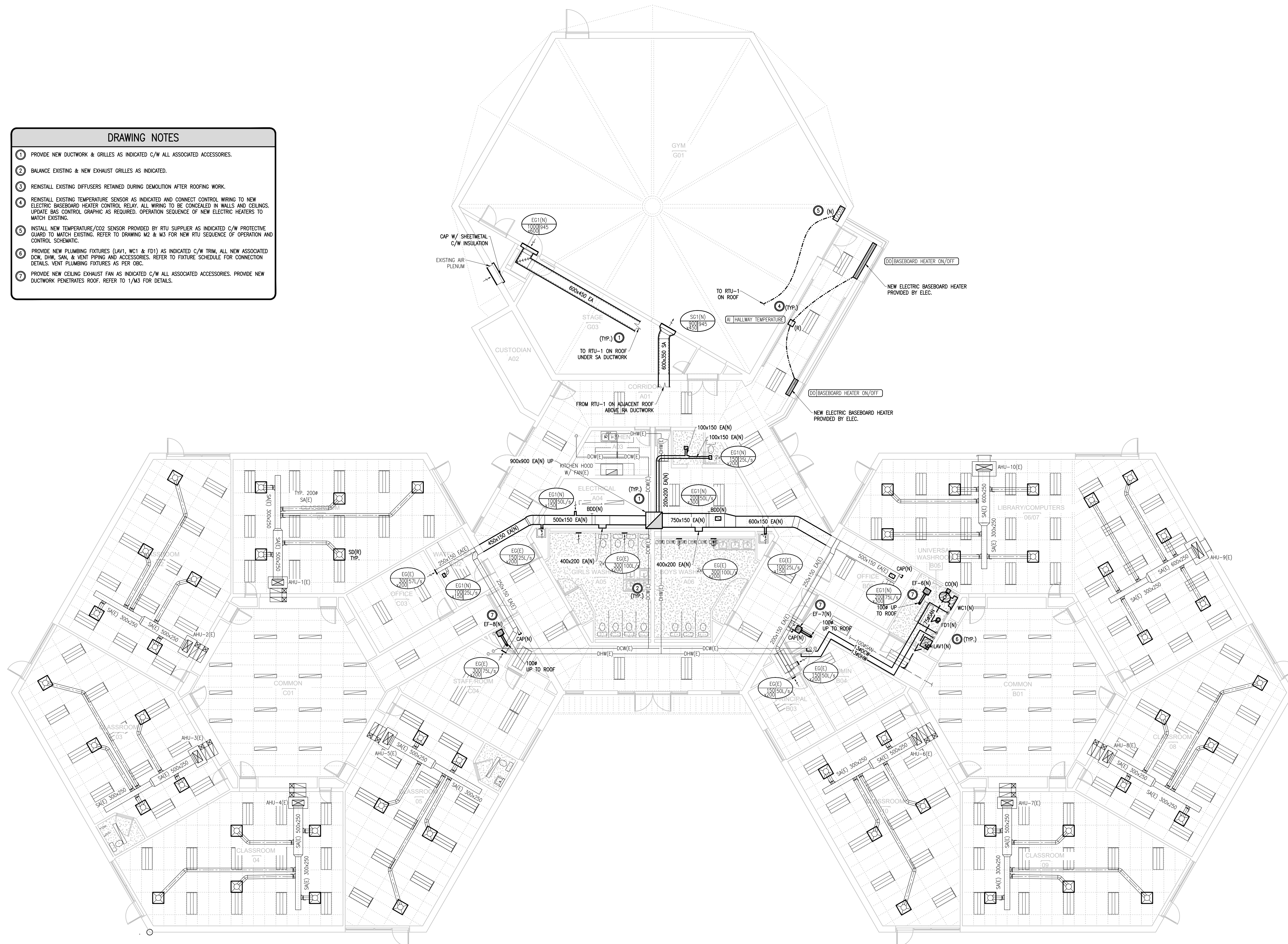
M4

MECHANICAL - DEMOLITION - GROUND FLOOR

1:100



- ① PROVIDE NEW DUCTWORK & GRILLES AS INDICATED C/W ALL ASSOCIATED ACCESSORIES.
- ② BALANCE EXISTING & NEW EXHAUST GRILLES AS INDICATED.
- ③ REINSTALL EXISTING DIFFUSERS RETAINED DURING DEMOLITION AFTER ROOFING WORK.
- ④ REINSTALL EXISTING TEMPERATURE SENSOR AS INDICATED AND CONNECT CONTROL WIRING TO NEW ELECTRIC BASEBOARD HEATER CONTROL. RELAY ALL WIRING TO BE CONCEALED IN WALLS AND CEILINGS. UPDATE BAS CONTROL GRAPHIC AS REQUIRED. OPERATION SEQUENCE OF NEW ELECTRIC HEATERS TO MATCH EXISTING.
- ⑤ INSTALL NEW TEMPERATURE/CO2 SENSOR PROVIDED BY RTU SUPPLIER AS INDICATED C/W PROTECTIVE GUARD TO MATCH EXISTING. REFER TO DRAWING M2 & M3 FOR NEW RTU SEQUENCE OF OPERATION AND CONTROL SCHEMATIC.
- ⑥ PROVIDE NEW PLUMBING FIXTURES (LAV1, WC1 & FD1) AS INDICATED C/W TRIM, ALL NEW ASSOCIATED PIPING, SAN & VENT PIPING AND ACCESSORIES. REFER TO FUTURE SCHEDULE FOR CONNECTION DETAIL. VENT PLUMBING FIXTURES PER OBC.
- ⑦ PROVIDE NEW CEILING EXHAUST FAN AS INDICATED C/W ALL ASSOCIATED ACCESSORIES. PROVIDE NEW DUCTWORK PENETRATES ROOF. REFER TO 1.M3 FOR DETAILS.



2026-05-01	ISSUED FOR PERMIT/TENDER	-
2026-03-20	ISSUED FOR 66%	-
DATE	REVISION	RE

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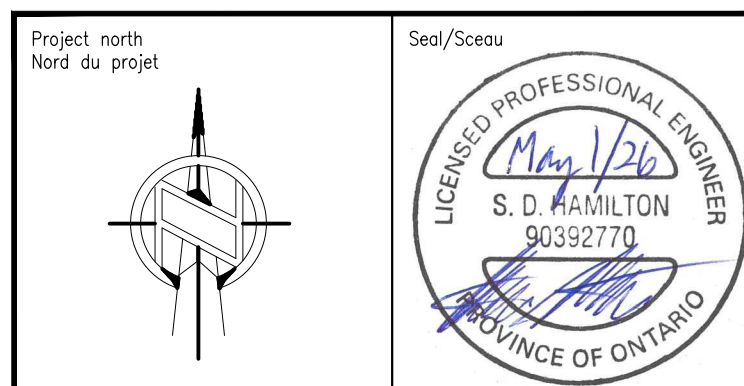
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Drawing title/Titre du dessin

MECHANICAL
NEW WORK
GROUND FLOOR

Scale	AS NOTED	Project no./No. du projet	
Echelle		2026-140	
Design by	J. CHENG	Drawing/Dessin	
Conçu par		M5	
Drawn by	Z. BO		
Dessiné par			
Reviewed by	S. HAMILTON		
Examiné par			OF 7

OF \overline{Z}

MECHANICAL - NEW WORK - GROUND FLOOR

1:100



- ① REMOVE EXHAUST FANS, ROOF DRAINS, AND PLUMBING VENTS AS INDICATED. RETAIN DURING ROOFING WORK. VERIFY OPERATIONS OF EXHAUST FANS PRIOR TO REMOVAL.
- ② REMOVE EXISTING CONDENSING UNIT OF A/C SYSTEM AS INDICATED AND DISCONNECT REFRIGERANT PIPING AS REQUIRED. RETAIN FOR REINSTALLATION AFTERWARDS. VERIFY OPERATION OF A/C SYSTEM PRIOR TO REMOVAL. PUMP DOWN REFRIGERANT TO CONDENSING UNIT LIQUID LIMIT AND RECLAIM EXCESS AMOUNT.
- ③ REMOVE EXISTING CONDENSING UNIT OF AHUs AS INDICATED C/W REFRIGERANT PIPING AND ASSOCIATED ACCESSORIES.
- ④ REMOVE EXISTING LOUVER AS INDICATED.



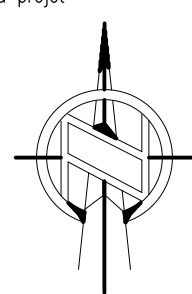
2026-05-01	ISSUED FOR PERMIT/TENDER	-
2026-03-20	ISSUED FOR 66%	-
DATE	REVISION	REF

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Project north
Nord du proje

Seal/Sequ



Project/Projet

Drawing title/Titre du dessin

MECHANICAL
DEMOLITION
ROOF

Scale Echelle	AS NOTED	Project no./No. du projet 2026-140
Design by Conçu par	J. CHENG	Drawing/Dessin
Drawn by Dessiné par	Z. BO	M6
Reviewed by Examiné par	S. HAMILTON	
		OF 7

DRAWING NOTES

- 1 REINSTALL EXHAUST FANS, ROOF DRAINS, AND PLUMBING VENTS RETAINED DURING ROOFING WORK AS INDICATED. VERIFY OPERATIONS OF REINSTALLED EXHAUST FANS AFTERWARDS.
- 2 REINSTALL EXISTING CONDENSING UNIT RETAINED DURING DEMOLITION ON EXISTING ENGINEERED SUPPORT SYSTEM. RECONNECT EXISTING REFRIGERANT PIPING TO CONDENSING UNIT AS REQUIRED. COMPLETELY FLUSH REFRIGERANT PIPING WITH NITROGEN PRIOR TO REFILLING. REPLACE RECLAIMED REFRIGERANT AND RECHARGE REFRIGERANT IN CONDENSING UNIT. VERIFY A/C SYSTEM OPERATION AFTER INSTALLATION.
- 3 PROVIDE NEW EXHAUST DUCT GOOSENECK AS INDICATED. CONNECT TO NEW DUCTWORK FROM WASHROOM BELOW AS REQUIRED.
- 4 PROVIDE NEW RTU AS INDICATED C/W DUCTWORK, CONTROLS AND ALL ASSOCIATED ACCESSORIES.
- 5 ENLARGE EXISTING WALL OPENING AS REQUIRED TO ACCOMMODATE NEW DUCTWORK INSTALLATION.

LOUVRE(E)
1050x900

ROOF D

ROOF A

ROOF C

ROOF F

ROOF B

ROOF G

N.I.C.

N.I.C.

1

MECHANICAL - NEW WORK - ROOF

M7

1:100

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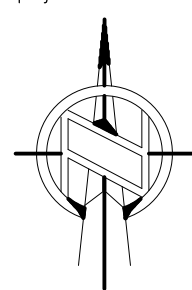
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Project north
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Seal/Scelu



Project/Projet

**FRONT OF YONGE PUBLIC
SCHOOL - ARCHITECTURAL
SERVICES**

Drawing title/Titre du dessin

**MECHANICAL
NEW WORK
ROOF**

Scale AS NOTED
Échelle

Design by J. CHENG
Conçu par

Drawn by Z. BO
Dessiné par

Reviewed by S. HAMILTON
Examiné par

Project no./No. du projet
2026-140

Drawing/Dessin

M7

of 7