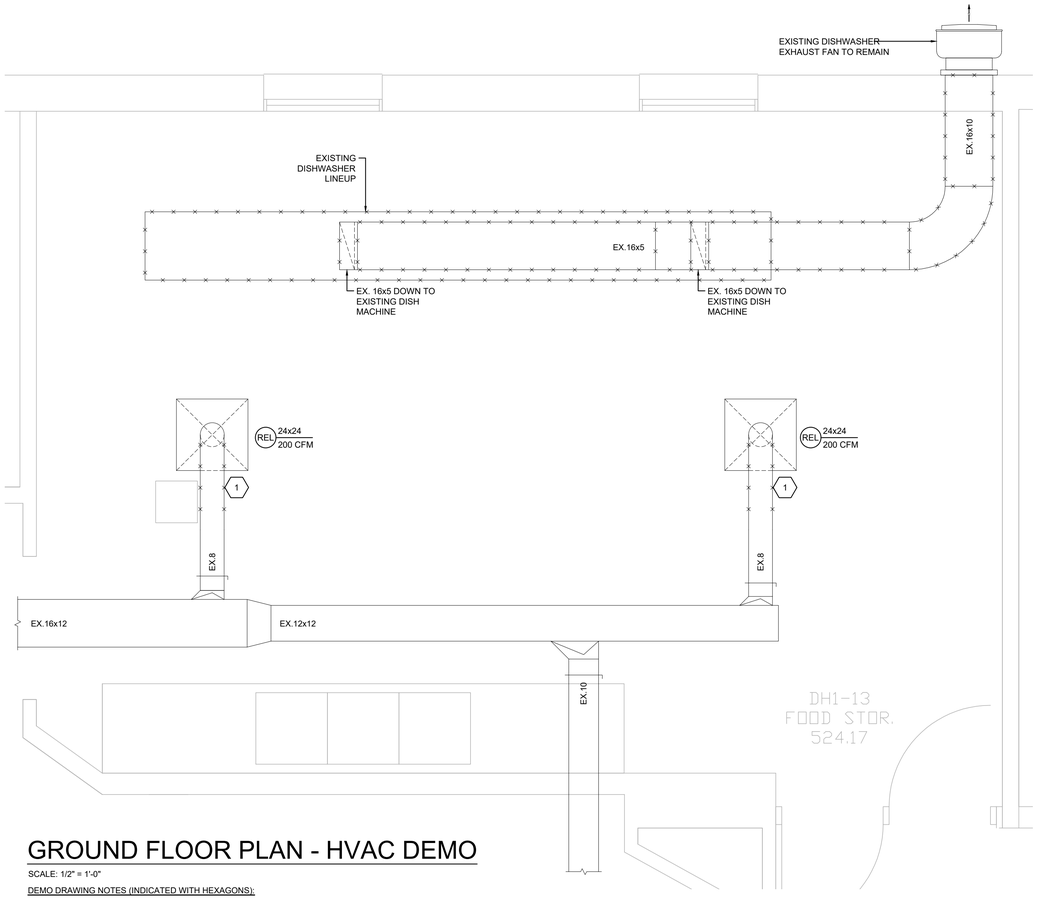

GROUND FLOOR PLAN - HVAC DEMO

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

DEMO DRAWING NOTES (INDICATED WITH HEXAGONS):

1. EXISTING SUPPLY DIFFUSER TO BE RELOCATED. SEE PROPOSED PLAN ON DRAWING M4 FOR MODIFICATIONS.
2. REMOVE ALL EXISTING DISHWASHER EXHAUST DUCTWORK BACK TO EXISTING WALL MOUNTED EXHAUST FAN.

DIFFUSER SCHEDULE

DWG REF	MANUF.	MODEL	FINISH	REMARKS
S1	PRICE	SCD	WHITE	SQUARE CONE DIFFUSER, STEEL CONSTRUCTION, 3 CONES REMOVABLE FROM THE DIFFUSER FACE.
R1	PRICE	80	WHITE	EGG CRATE GRILLLE, EXTRUDED ALUMINUM CONSTRUCTION, C/W VOLUME DAMPER.
E1	PRICE	630	WHITE	SINGLE DEFLECTION, LOUVERED RETURN GRILLE, ALUMINUM CONSTRUCTION.

GENERAL NOTE: MOUNTING FRAME TO SUIT CEILING TYPES. SEE ARCHITECTURAL REFLECTED CEILING PLAN DRAWINGS FOR CEILING TYPES. PROVIDE INTEGRAL FIRE STOP FLAPS WHERE FIRE DAMPERS ARE INDICATED ON DRAWINGS.

APPROVED MANUFACTURERS: PRICE, METALAIRE, NAILOR, TITUS, KREUGER

PLUMBING FIXTURE SCHEDULE

DWG REF	DESCRIPTION	HOT	COLD	DRAIN
FFD	FLOOR DRAIN- EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, REVERSIBLE CLAMPING COLLAR WITH PRIMARY AND SECONDARY WEEPHOLES, ADJUSTABLE CAST IRON (STANDARD) HUB FUNNEL, AND NO HUB (STANDARD) OUTLET. WATTS DRAINAGE - MODEL: FD-100-DD	---	---	3"
HD	HUB DRAIN- EPOXY COATED CAST IRON FLOOR DRAIN WITH ANCHOR FLANGE, WEEPHOLES, ADJUSTABLE NICKEL BRONZE (STANDARD) HUB FUNNEL, AND NO HUB (STANDARD) OUTLET. WATTS DRAINAGE-MODEL: FD-200-DD	---	---	3"

GENERAL NOTES: (APPLICABLE TO ALL DRAWINGS)

- THESE DRAWINGS ARE AN INTEGRAL PART OF THE SPECIFICATIONS WHICH ACCOMPANY THEM.
- ALL MATERIALS AND WORKMANSHIP SHALL BE NEW UNLESS NOTED OTHERWISE, FREE OF DEFECTS, AND COMPLY WITH ALL APPLICABLE STANDARDS.
- ALL DIMENSIONS ARE IN INCHES UNLESS NOTED OTHERWISE
- INSTALL DUCTWORK / PIPING TIGHT TO UNDERSIDE OF STRUCTURE UNLESS NOTED OTHERWISE.
- DO NOT SCALE DRAWINGS. OBTAIN ALL DIMENSIONS FROM EXISTING ARCHITECTURAL PLANS, SITE INSPECTIONS, AND MANUFACTURER'S SHOP DRAWINGS.
- ALL MATERIALS WITHIN RETURN AIR PLENUMS SHALL HAVE A FLAME—SPREAD RATING NOT MORE THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT MORE THAN 50.
- OPENINGS IN EXTERIOR WALLS AND ROOF ARE TO BE PROPERLY FLASHED AND MADE WEATHERPROOF.
- ALL NECESSARY CUTTING / PATCHING FOR MECHANICAL WORK SHALL BE PROVIDED BY APPROPRIATE TRADE(S) AT CONTRACTOR'S EXPENSE UNLESS NOTED OTHERWISE.
- MAKE GOOD ALL BUILDING COMPONENTS DAMAGED BY WORK OF THIS TRADE TO THE CONSULTANT SATISFACTION.
- PROVIDE ALL SLEEVES, INSERTS AND HANGERS REQUIRED FOR THE WORK. TREAT ALL SLEEVES OR HOLES PIERCING ACOUSTICAL SEPARATIONS FOR INSTALLATIONS OF THIS DIVISION TO MAINTAIN ACOUSTICAL RATING. ALL GAPS SHALL BE PACKED WITH ACOUSTICAL INSULATION AND SEALED AT BOTH ENDS WITH ACOUSTICAL CAULKING. PATCH ALL OPENINGS AROUND INSTALLATIONS OF THIS DIVISION PIERCING FIRE OR SMOKE SEPARATIONS WITH AN APPROVED WATERTIGHT SMOKE AND FIRE STOP SEALANT.
- INSTALL ALL EQUIPMENT & ASSOCIATED DUCTWORK, PIPING, APPURTENANCES TO PROVIDE MAINTENANCE ACCESS. ALLOW FOR ALL ACCESS DOORS REQUIRED FOR EQUIPMENT INSTALLATIONS & SERVICE. ENSURE PROPER ACCESS DOOR SIZE, TYPE AND FIRE RATING.
- COORDINATE ALL WORK WITH OTHER TRADES AND SUPPLIERS/MANUFACTURERS TO AVOID INTERFERENCES AND CONFLICTS BETWEEN SERVICES. PLAN WORK WELL IN ADVANCE TO ELIMINATE INSTALLATION AND COORDINATE DIFFICULTIES. COOPERATE WITH OTHER TRADES ON SITE TO RESOLVE INTERFERENCES TO SATISFACTORILY COMPLETE THE PROJECT.
- THIS TRADE IS RESPONSIBLE FOR ALL EXCAVATION / BACKFILL REQUIRED TO INSTALL SERVICES SHOWN ON THESE DRAWINGS
- BACKFLOW PREVENTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CSA STANDARD B64
- DEBRIS WILL BE KEPT TO A MINIMUM. ON COMPLETION OF CONSTRUCTION AND PRIOR TO THE FINAL INSPECTION AND ACCEPTANCE BY THE OWNER, SITE SHALL BE CLEANED AND ALL SCRAP MATERIALS RESULTING FROM THE WORK SHALL BE REMOVED.
- PRIOR TO THE FINAL INSPECTION, ALL EQUIPMENT SHALL BE CLEANED. ALL CONSTRUCTION DUST AND DIRT SHALL BE REMOVED FROM INSTALLED EQUIPMENT AT THE END OF THE JOB.
- EXISTING INSTALLATIONS SHOWN FOR GENERAL REFERENCE ONLY. ATTEND SITE TO ASSESS WORK PRIOR TO BID SUBMISSION. INCLUDE ALL COSTS TO MODIFY AND / OR EXTEND NEW WORK AS REQUIRED TO MEET DESIGN INTENT. VERIFY ALL EXISTING DUCT / PIPE SIZES & CLEARANCES ON SITE.
- SCHEDULE AND PHASE WORK TO REDUCE INTERFERENCE AND DOWNTIME OF EXISTING SYSTEMS. NOTIFY OWNER'S REPRESENTATIVE OF ALL DOWNTIME PRIOR TO PROCEEDING WITH WORK.
- REMOVE EXISTING CEILING TILES AS REQUIRED TO PERFORM WORK. SAFELY STORE TILES FOR REINSTALLATION AFTER WORK & INSPECTIONS ARE COMPLETE. EXISTING DAMAGED TILES MUST BE IDENTIFIED & REPORTED TO OWNER'S REPRESENTATIVE BEFORE REMOVAL. REPLACE ANY DAMAGED TILES TO MATCH EXISTING.
- MEASURE & DOCUMENT EXISTING AIRFLOWS AT GRILLES / REGISTERS / DIFFUSERS TO BE RE-BALANCED. FINAL BALANCING REPORT MUST INCLUDE AS-FOUND AND FINAL AIRFLOW MEASUREMENTS.
- WHERE REPLACEMENT EQUIPMENT EXPOSES PREVIOUSLY UNFINISHED SURFACES, FINISH TO MATCH ADJACENT ASSEMBLIES.
- ALLOW FOR SCOPING OF EXISTING CONCEALED DRAINAGE PIPING TO VERIFY LOCATION & ROUTING.

GENERAL DEMOLITION NOTES: (APPLICABLE TO ALL DRAWINGS)

- ALL EXISTING EQUIPMENT TO REMAIN UNLESS IDENTIFIED OTHERWISE ON THE DRAWINGS, GENERAL NOTES OR SPECIFICATIONS.
- EXTENTS OF DEMOLITION SHOWN ARE APPROXIMATE AND THIS TRADE IS RESPONSIBLE FOR ALL DEMOLITION REQUIRED TO MEET DESIGN INTENT.
- REMOVE ALL UNUSED, ABANDONED OR REDUNDANT PIPING, HANGERS, & ACCESSORIES BACK TO SOURCE & CAP.
- COORDINATE WITH FACILITY MAINTENANCE DEPARTMENT FOR DISPOSAL OF REMOVED DEVICES. DISPOSE OF ALL UNWANTED DEVICES AS REQUIRED AS PER FACILITY STANDARDS.

PIPING LEGEND

ITEM	DESCRIPTION
	NEW ITEM
	EXISTING ITEM TO REMAIN
x x x	EXISTING ITEM TO BE REMOVED
	BELOW FLOOR PIPING
	POTABLE (DOMESTIC) COLD WATER (DCW)
	POTABLE (DOMESTIC) HOT WATER (DHW)
SAN	SANITARY DRAIN
	GATE VALVE
	BALL VALVE
	BACKFLOW PREVENTER
DCVA	DOUBLE CHECK VALVE ASSEMBLY
RP	REDUCED PRESSURE ASSEMBLY
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	PIPE CAP
	PIPE SINGLE LINE CUTOFF
CO	FLOOR CLEAN OUT
FD FC	FLOOR DRAIN; FFD: FUNNEL FLOOR DRAIN; HD: HUB DRAIN
	NEW CONNECTION TO EXISTING

THIS IS A STANDARD LEGEND. ALL SYMBOLS MAY NOT NECESSARILY BE USED ON DRAWINGS.

DUCTWORK LEGEND

SYMBOL	DESCRIPTION
	NEW ITEM
	EXISTING ITEM TO REMAIN
x x x	EXISTING ITEM TO BE REMOVED
REL	EXISTING ITEM TO BE RELOCATED
ER	EXISTING ITEM IN RELOCATED POSITION
EX	EXISTING ITEM TO REMAIN
	DUCTWORK SHOWN DOUBLE LINE
	BALANCING DAMPER
BDD	BACKDRAFT DAMPER
	NEW CONNECTION TO EXISTING
	SUPPLY AIR GRILLE
	RETURN AIR GRILLE
	SIDEWALL GRILLE C/W BALANCE DAMPER TYPICAL AT ALL SIDEWALL GRILLES
	EXTERNALLY INSULATED DUCT
?	DRAWING NOTE TAG
? 7x7" ???	DIFFUSER TAG DIFFUSER/GRILLE SIZE (AND NECK SIZE WHERE APPLICABLE) AIR VOLUME (CFM OR l/s AS INDICATED) DIFFUSER/GRILLE DESIGNATION (REFER TO SCHEDULE FOR TYPE)
??? ??	EQUIPMENT TAG EQUIPMENT TYPE EQUIPMENT NUMBER (REFER TO SCHEDULES FOR INFO)
	NEW DIFFUSER NOTES SQUARE DIFFUSER (ROUND IF SHOWN) DUCT COLLAR CONNECTION SIZE AS PER GRILLE AND DIFFUSER SCHEDULE FLEXIBLE DUCT - MAX. 5'-0" (1.5M) DIFFUSER SUPPLY DUCT - TO BE THE SAME SIZE AS DIFFUSER COLLAR BALANCE DAMPER - TYPICAL AT ALL DIFFUSER SUPPLIES SUPPLY DUCT
	EXISTING DIFFUSER NOTES EXISTING DIFFUSER - RELOCATE TO NEW LOCATION AS REQUIRED TO SUIT LAYOUT EXISTING BALANCE DAMPER - RE-BALANCE TO PROVIDE AIR CAPACITY INDICATED - PROVIDE DAMPER IF ONE DOES NOT EXIST. EXISTING/NEW SUPPLY DUCT PER DWGS

THIS IS A STANDARD LEGEND. ALL SYMBOLS MAY NOT NECESSARILY BE USED ON DRAWINGS.

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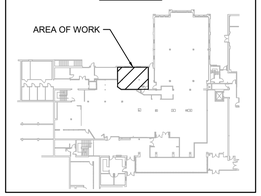
KEYPLAN



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05	PERMIT AND TENDER	24.02.26

NORTH

LICENSED PROFESSIONAL ENGINEER
J. Gordon
24.02.26
PROVINCE OF ONTARIO

DESIGN	BCD	DRAWN	BCD
CHECKED	JRG	REVIEWED	JRG

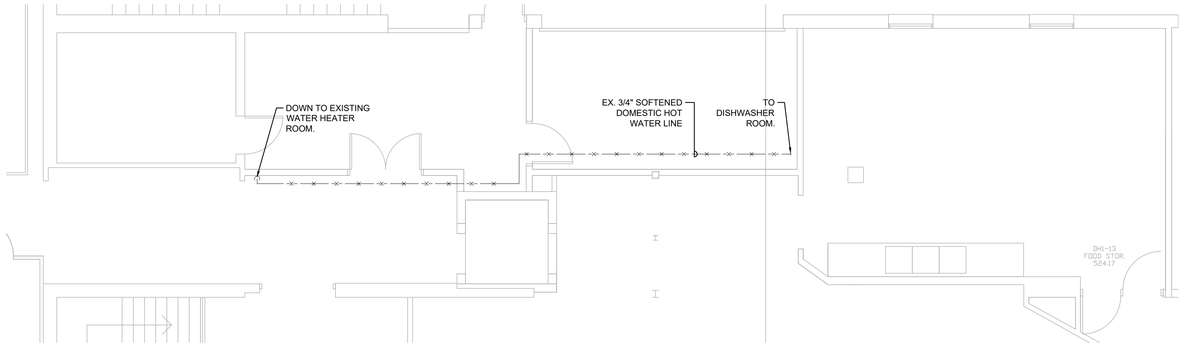
PROJECT
WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS
75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.
CE-5716

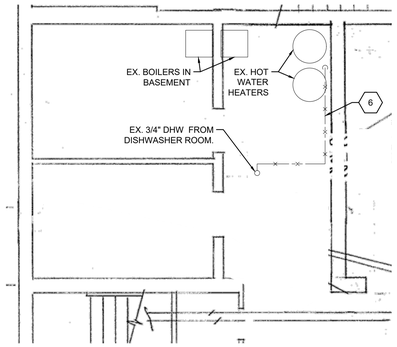
DRAWING TITLE
MECHANICAL SCHEDULES, LEGENDS & GROUND FLOOR PLAN - HVAC DEMO

DRAWING NUMBER
M1 OF 6



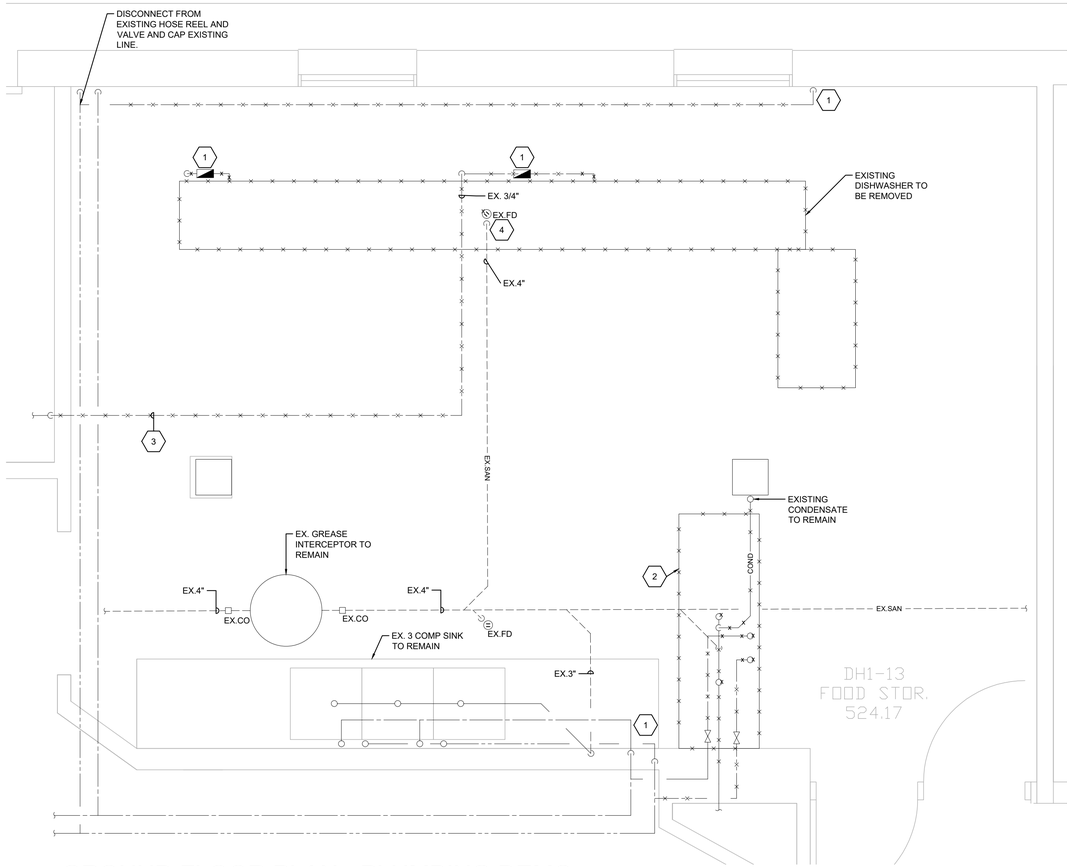
EXTENDED FIRST FLOOR PLAN - PLUMBING DEMO

SCALE: 3/16" = 1'-0"



BASEMENT FLOOR PLAN - PLUMBING DEMO

SCALE: 3/16" = 1'-0"



GROUND FLOOR PLAN - PLUMBING DEMO

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

DEMO DRAWING NOTES (INDICATED WITH HEXAGONS):

1. REMOVE EXISTING BACKFLOW PREVENTORS AND HOSE REEL BEHIND THE EXISTING DISH MACHINE AND RETURN THEM TO THE FACILITY TEAM.
2. REMOVE EXISTING TWO COMPARTMENT SINK AND HAND OVER TO FACILITY. CAP EXISTING SANITARY PIPING IN WALL OR FLUSH WITH FLOOR AFTER REMOVAL OF PLUMBING FIXTURE. EXISTING DOMESTIC WATER PIPING TO BE REMOVED BACK TO MAIN AND CAPPED
3. REMOVE EXISTING DEDICATED 3/4" DOMESTIC HOT WATER LINE TO THE DISHWASHER BACK TO THE MAIN BRANCH OFF THE WATER TANKS.
4. REMOVE EXISTING FLOOR DRAIN. TEMPORARILY CAP EXISTING LINE FOR USE WITH NEW DISHWASHER LINEUP. SEE DRAWING M3 FOR REQUIRED MODIFICATIONS.
5. TRACE AND CONFIRM ROUTING ON SITE PRIOR TO DEMOLITION.
6. REMOVE EXISTING 3/4" DHW LINE FROM HERE TO EXISTING CONNECTION AT DISHWASHER.

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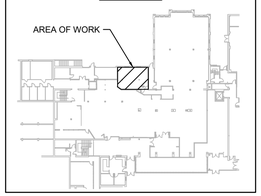

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NORTH

DESIGN	BCD	DRAWN	BCD
CHECKED	JRG	REVIEWED	JRG

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

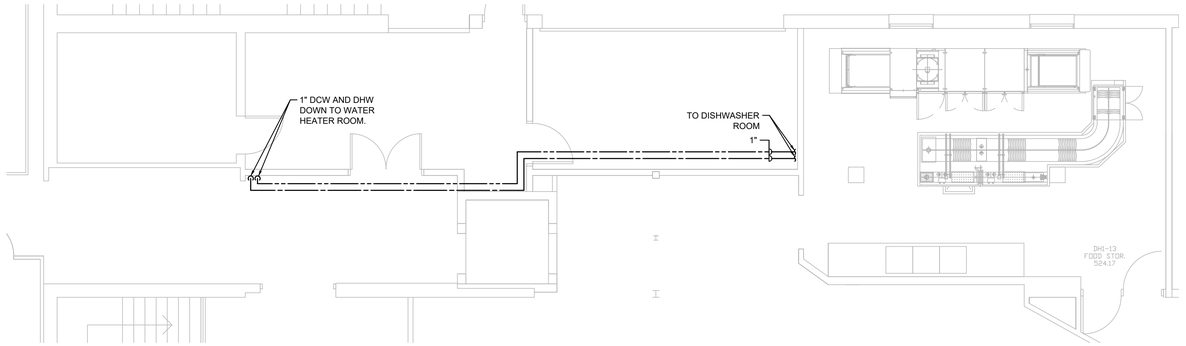
CE-5716

DRAWING TITLE

PARTIAL BASEMENT/GROUND FLOOR PLAN - PLUMBING DEMO

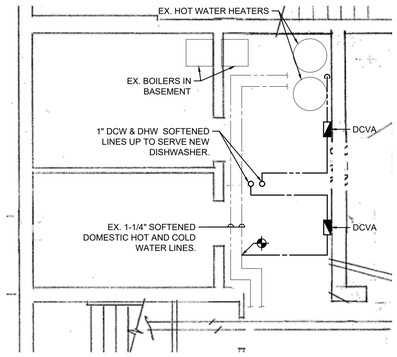
DRAWING NUMBER

M2 OF 6



EXTENDED FIRST FLOOR PLAN - PLUMBING

SCALE: 3/16" = 1'-0"

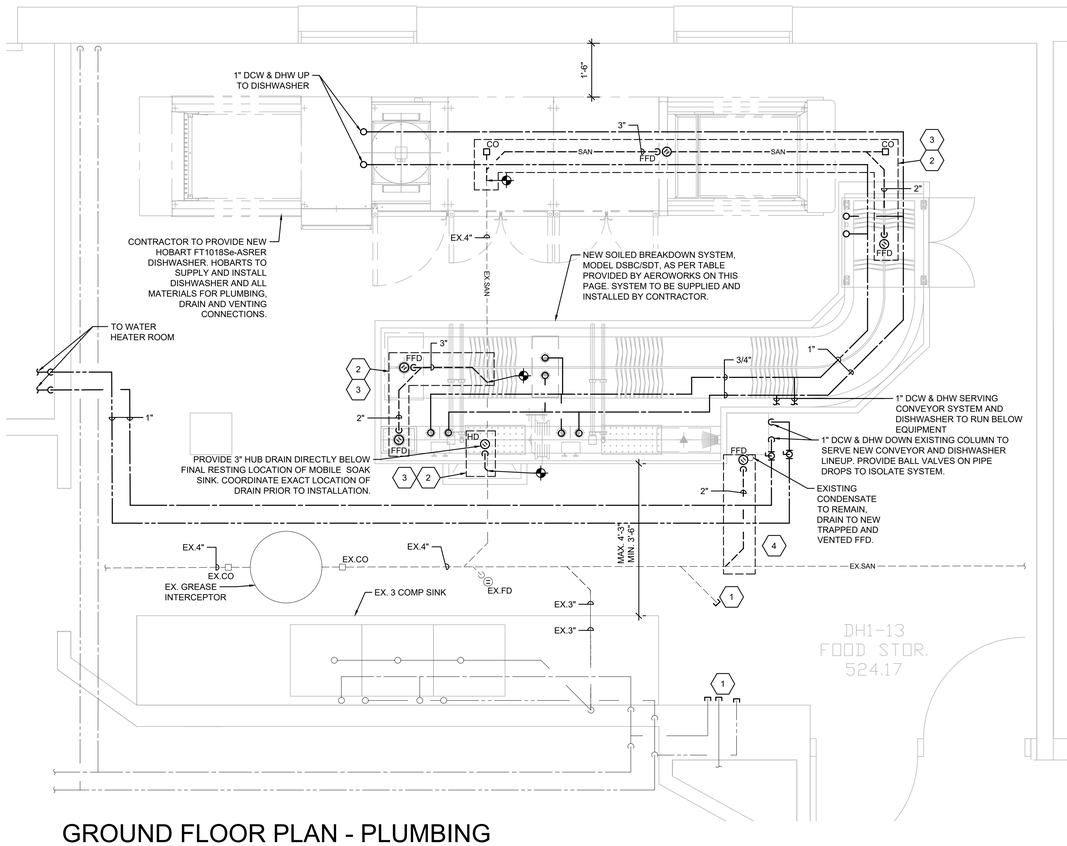


BASEMENT FLOOR PLAN - PLUMBING

SCALE: 3/16" = 1'-0"

SOILED BREAKDOWN SYSTEM EQUIPMENT					
EQUIPMENT	MODEL NUMBER	QTY	DCW (ID)	DHW (ID)	SAN (ID)
SOILED DISH TABLE	SDT	1	1/2" (QTY. 2)	1/2" (QTY. 2)	1 1/2"
DOUBLE SLAT BELT ACCUMULATION CONVEYOR	DSBC	1	1/2" AT DRIVE CABINET	1/2" AT DRIVE CABINET	1-1/2" AT DRIVE CABINET 1-1/2" AT TAIL TANK
HOSE CLEAN UP STATION	HRA-30	1	1/2"	1/2"	
MOBILE SOAK SINK	SS2323	1			
S/S TABLE	S/S TABLE	1			

DISHWASHING EQUIPMENT CONTACT LIST
AEROWORKS - CONVEYOR SYSTEM HENIK PATEL - HENIK@AEROWORKS.COM
HOBART - DISHWASHER SYSTEM RYLEY MARTINELL - RYLEY.MARTINELL@HOBARTS.CA 437-772-1948



GROUND FLOOR PLAN - PLUMBING

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

DRAWING NOTES (INDICATED WITH HEXAGONS):

1. CAP EXISTING SANITARY PIPING IN WALL OR FLUSH WITH FLOOR.
2. TRENCH FLOOR AS REQUIRED TO CONNECT DRAINS TO PROPOSED DISHWASHER AND CONVEYOR SYSTEMS.
3. SANITARY CONNECTIONS TO PROPOSED DISHWASHER AND CONVEYOR SYSTEMS TO BE TRAPPED AND VENTED. VENTS TO RUN UNDER SLAB TO RISE TIGHT TO WALL OR COLUMN.
4. TRENCH FLOOR AS REQUIRED TO CONNECT TO EXISTING CONDENSATE LINE FROM ABOVE. TRAP AND VENT AS REQUIRED BY CODE.

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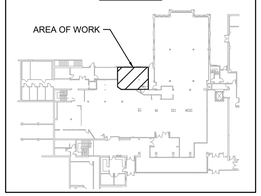

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NORTH

LICENSED PROFESSIONAL ENGINEER
J. Gordon
24.02.26
PROVINCE OF ONTARIO

DESIGN	BCD	DRAWN	BCD
CHECKED	JRG	REVIEWED	JRG

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

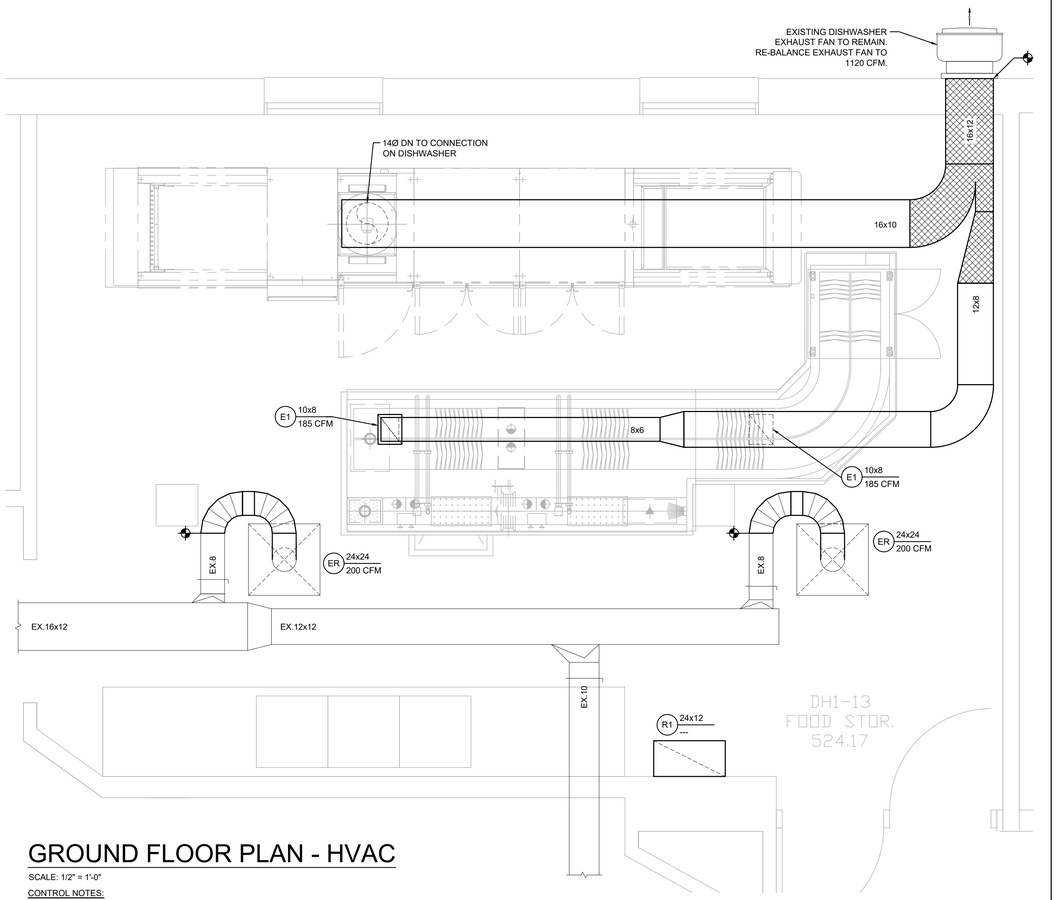
CE-5716

DRAWING TITLE

PARTIAL BASEMENT/GROUND FLOOR PLAN - PROPOSED PLUMBING

DRAWING NUMBER

M3 OF 6



GROUND FLOOR PLAN - HVAC

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

CONTROL NOTES:

1. GENERAL

- REFER TO DRAWINGS AND SCHEMATICS FOR DEVICE AND EQUIPMENT LOCATIONS.

EXHAUST SYSTEM:
EXISTING DISHWASHER EXHAUST FAN

GENERAL

- COORDINATE OCCUPANCY SCHEDULE WITH OWNER PRIOR TO PROGRAMMING TIME CLOCK

CONTROL DEVICES:

- PROGRAMMABLE 7-DAY DIGITAL TIME CLOCK

OPERATING SEQUENCE:

- ENERGIZE / DE-ENERGIZE FAN ON OFF FROM TIMECLOCK

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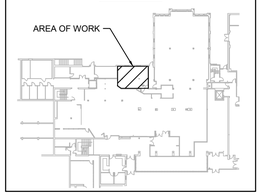

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PROJECT NO.

CE-5716

DRAWING TITLE

PARTIAL GROUND FLOOR
PLAN - PROPOSED HVAC

DRAWING NUMBER

M4 OF 6

1. MECHANICAL GENERAL REQUIREMENTS:

1.1. GENERAL:

1.1.1. MAKE SITE VISIT(S) AS NECESSARY BEFORE BID CLOSING TO ESTABLISH AND VERIFY ALL EXISTING CONDITIONS. MAKE ALLOWANCE FOR ANY NEW OR EXISTING SERVICE AND EQUIPMENT RELOCATIONS NECESSARY TO COMPLETE THE WORK AND INCLUDE IN THE BID PRICE. EXTRAS WILL NOT BE ALLOWED FOR FAILURE TO PROPERLY EVALUATE EXISTING CONDITIONS.

1.1.2. THE DRAWINGS SHOW THE GENERAL INTENT OF THE WORK, NOT THE DETAILS OF INSTALLATION. CO-ORDINATE THE ROUTING AND INSTALLATION OF ALL MECHANICAL SERVICES WITH ALL EXISTING CONDITIONS, STRUCTURE AND THE WORK OF ALL OTHER TRADES. PROVIDE INSTALLATION DRAWINGS AS REQUIRED.

1.1.3. DO NOT SCALE MECHANICAL DRAWINGS. TAKE FIELD DIMENSIONS PRIOR TO ANY INSTALLATION.

1.2. DESCRIPTION: PROVIDE WORK IN ACCORDANCE WITH FULL INTENT AND MEANING OF DRAWINGS AND SPECIFICATIONS. THE WORD “PROVIDE” WHERE USED IN THE CONTRACT DOCUMENTS, IS TO BE INTERPRETED AS “SUPPLY AND INSTALL” ALONG WITH ALL ASSOCIATED HARDWARE AND CONNECTIONS.

1.3. WORKMANSHIP: PROVIDE ALL NEW MATERIALS AND EQUIPMENT WITH THE APPROPRIATE LISTING (I.E. CSA, ULC, CETL, ETC.) ALL WORKMANSHIP BY THIS TRADE SHALL BE FIRST CLASS, CONFORMING TO INDUSTRY STANDARD PRACTICES FOR SAFETY, ACCESSIBILITY, DURABILITY AND NEATNESS FOR ACCEPTANCE BY THE OWNER'S REPRESENTATIVES.

1.4. SLEEVES, HANGERS, INSERTS: PROVIDE ALL SLEEVES, INSERTS AND HANGERS REQUIRED FOR THE MECHANICAL WORK/ TREAT ALL SLEEVES OR HOLES PIERCING ACOUSTICAL SEPARATIONS FOR INSTALLATIONS OF THE DIVISION TO MAINTAIN ACOUSTICAL RATING. ALL GAPS SHALL BE PACKED WITH ACOUSTICAL INSULATION AND SEALED AT BOTH ENDS WITH ACOUSTICAL CAULKING. PATCH ALL OPENINGS AROUND INSTALLATIONS OF THIS DIVISION PIERCING FIRE OR SMOKE SEPARATIONS WITH AN APPROVED WATERTIGHT SMOKE AND FIRE STOP SEALANT.

1.5. INTERPRETATION: DIVISION OF THE WORK AMONG SUPPLIERS OR VENDORS AND SUBCONTRACTORS IS SOLELY THE CONTRACTOR'S RESPONSIBILITY. NEITHER THE OWNER NOR CONSULTANT ASSUMES ANY RESPONSIBILITY TO ACT AS AN ARBITER TO ESTABLISH SUBCONTRACT TERMS BETWEEN SECTORS OR DISCIPLINES OF WORK.

1.6. COORDINATION BETWEEN TRADES: CO-ORDINATE THE WORK OF THIS TRADE WITH ALL OTHER TRADES ON THE JOB SO THAT THE WORK MAY PROGRESS WITHOUT ANY DELAY. SCHEDULE AND PHASE DEMOLITION AND NEW WORK TO REDUCE INTERFERENCE AND DOWNTIME OF EXISTING SYSTEMS. NOTIFY OWNER'S REPRESENTATIVE OF ALL DOWNTIME PRIOR TO PROCEEDING WITH WORK.

1.7. DISCREPANCY: IF A DISCREPANCY IS FOUND IN THE SPECIFICATION OR ON THE DRAWINGS, REQUEST CLARIFICATION PRIOR TO THE END OF THE QUESTION PERIOD SO THAT CLARIFICATION CAN BE PROVIDED IN WRITING.

1.8. REGULATORY REQUIREMENTS: CONFORM TO GOVERNING MUNICIPAL AND PROVINCIAL CODES, RULES AND REGULATIONS AND/OR AUTHORITIES HAVING JURISDICTION.

1.9. CODES AND STANDARDS:

1.9.1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE ONTARIO BUILDING CODE, THE ONTARIO FIRE CODE AND ANY OTHER LOCAL REGULATIONS HAVING JURISDICTION OVER THE WORK OF THIS TRADE.

1.9.2. WHERE A CODE OR STANDARD IS REFERENCED, THE LATEST VERSION OF THE CODE OR STANDARD REFERENCED IN THE APPLICABLE BUILDING CODE IS TO BE APPLIED.

1.10. SAFETY: COMPLY WITH ALL PROVINCIAL/FEDERAL AND/OR LOCAL SAFETY REGULATIONS, INCLUDING THE OCCUPATIONAL HEALTH AND SAFETY ACT. IN ADDITION, COMPLY WITH ALL OF THE OWNER'S HEALTH AND SAFETY REQUIREMENTS.

1.11. PERMITS AND FEES: OBTAIN ALL PERMITS REQUIRED FOR INSTALLATION OF MECHANICAL TRADES WORK, ARRANGE FOR INSPECTIONS TESTS THEREWITH AND PAY ALL COSTS FOR PERMITS, INSPECTIONS, AND ASSOCIATED FEES. THIS INCLUDES ANY TSSA INSPECTION AND/OR CERTIFICATION. OBTAIN PERMITS IMMEDIATELY AFTER NOTIFICATION OF AWARD OF CONTRACT.

1.12. TAXES: ENSURE THAT PROVINCIAL AND/OR FEDERAL TAXES ARE INCLUDED WHERE REQUIRED.

1.13. WARRANTY: PROVIDE A WRITTEN WARRANTY FOR ALL MATERIALS, EQUIPMENT AND LABOUR FOR A ONE-YEAR PERIOD TO BEGIN AT THE TIME OF SUBSTANTIAL COMPLETION. COMPLETE ALL WARRANTY REGISTRATION DOCUMENTATION ON BEHALF OF THE BUILDING OWNER. INCLUDE COPIES OF COMPLETED DOCUMENTATION IN OPERATIONS AND MAINTENANCE MANUALS.

1.14. CERTIFICATION: PROVIDE MANUFACTURER'S WRITTEN CERTIFICATION OF THE INSTALLATION AND OPERATION OF ALL SYSTEMS AND MAJOR EQUIPMENT.

1.15. EXISTING SERVICE:

1.15.1. DO NOT SHUT DOWN OR MAKE CONNECTIONS TO ANY EXISTING SERVICE WITHOUT WRITTEN PERMISSION OF THE OWNER.

1.15.2. BE RESPONSIBLE FOR DEMOLITION AND REMOVAL OF MECHANICAL EQUIPMENT AND SERVICES DESIGNATED FOR REMOVAL ON DRAWINGS.

1.16. SITE PROTECTION AND CLEANLINESS: PROTECT ALL WORK AND MATERIALS, BEFORE AND AFTER ERECTION, FROM WEATHER AND OTHER HAZARDS, AND KEEP IN A CLEAN AND ORDERLY MANNER. AVOID ACCUMULATION OF DEBRIS AS THE WORK PROGRESSES. ON COMPLETION OF THE CONSTRUCTION AND PRIOR TO THE FINAL INSPECTION AND ACCEPTANCE BY THE OWNER, CLEAN UP AND REMOVE FROM THE SITE ALL SCRAP MATERIALS RESULTING FROM THE WORK OF THIS TRADE.

1.17. ADJUSTMENT AND OPERATION OF SYSTEMS: WHEN WORK IS COMPLETE, ADJUST ALL EQUIPMENT ITEMS, OF VARIOUS SYSTEMS, FOR PROPER OPERATION WITHIN FRAMEWORK OF DESIGN INTENT, AND OPERATING CHARACTERISTICS AS PUBLISHED BY EQUIPMENT MANUFACTURER.

1.18. MISCELLANEOUS STEEL: SUPPLY AND INSTALL MISCELLANEOUS STRUCTURAL SUPPORTS, PLATFORMS, AND BRACES, AS REQUIRED TO HANG OR SUPPORT ALL EQUIPMENT, PIPING, DUCTWORK AND SIMILAR ITEMS.

1.19. EQUIPMENT INSTALLATION: INSTALL AND START UP ALL ITEMS OF EQUIPMENT, DEVICES AND SYSTEMS IN ACCORDANCE WITH MOST RECENT MANUFACTURER'S PUBLISHED GUIDELINES AND RECOMMENDATIONS. CONTRACTOR IS RESPONSIBLE FOR ASCERTAINING MANUFACTURERS INSTALLATION GUIDELINES AND RECOMMENDATIONS. TOUCH-UP ALL SHOP PAINTED EQUIPMENT DAMAGED IN TRANSIT OR DURING INSTALLATION TO MATCH ORIGINAL SHOP FINISH.

1.20. CUTTING AND PATCHING: PROVIDE ALL CUTTING AND PATCHING REQUIRED FOR THE WORK OF THIS TRADE. ALL CUTTING AND PATCHING SHALL BE PERFORMED BY TRADE SPECIALIZING IN THE MATERIAL TO BE PATCHED. INCLUDE ALL COSTS FOR CUTTING AND PATCHING RELATED TO THE WORK OF THIS TRADE IN THE BID PRICE. WHERE PIPES AND DUCTS ARE SHOWN PASSING THROUGH EXISTING WALLS, FLOORS, AND ROOF, CUT AND PATCH THE NECESSARY OPENINGS. SHOULD CUTTING, REPAIRING, AND PATCHING OF PREVIOUSLY FINISHED WORK, OF OTHER TRADES, BE REQUIRED TO ALLOW INSTALLATION OF MECHANICAL WORK, PAY ALL COSTS FOR TRADE SECTION CONCERNED TO PERFORM WORK.

1.21. CHANGES IN THE WORK: CHANGES TO THE CONTRACT REQUIRING ADDITIONS TO OR DELETIONS FROM THE WORK OF THIS DIVISION SHALL BE CARRIED OUT UPON WRITTEN REQUEST OF THE CONSULTANT. EXTRAS TO THE CONTRACT OR CREDITS SHALL BE SUBMITTED WITH A COMPLETE COST BREAKDOWN AS FOLLOWS:

- MATERIALS, QUANTITIES AND UNIT PRICES FOR ALL EQUIPMENT REQUIRED OR DELETED
- UNIT HOURS
- TOTAL MATERIAL COST
- TOTAL HOURS
- HOURLY RATE (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL CONTRACT)
- TOTAL OVERHEAD AND PROFIT (REFER TO SUPPLEMENTARY CONDITIONS AND GENERAL CONTRACT)

1.1. COMPLETION: PRIOR TO THE FINAL INSPECTION, CLEAN ALL MECHANICAL EQUIPMENT. CLEAN ALL CONSTRUCTION DUST AND DIRT FROM INSTALLED EQUIPMENT AT THE END OF THE JOB. REPAIR ANY DAMAGE BY THE MECHANICAL TRADE TO EXISTING BUILDINGS OR EQUIPMENT, ETC TO THE CONSULTANTS SATISFACTION.

1.2. SUBMITTALS:

1.2.1. SHOP DRAWINGS:

1.2.1.1. SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT SUPPLIED BY MECHANICAL DIVISION. SUBMIT ELECTRONIC COPIES TO CONSULTANT FOR REVIEW.

1.2.1.2. SUBMIT UNITS OF MEASURE IN EITHER METRIC OR IMPERIAL THAT MATCH THOSE OF THE DRAWINGS.

1.2.1.3. PROVIDE TITLE SHEET INCLUDING PROJECT NAME, SHOP DRAWING NAME (INCLUDING SPECIFICATION CLAUSE REFERENCE).

1.2.1.4. EACH SHOP DRAWING MUST BEAR STAMP AND SIGNATURE OF RESPONSIBLE OFFICIAL IN CONTRACTOR'S AND SUBCONTRACTOR'S ORGANIZATION, FOR EACH SUBMISSION, AS EVIDENCE THAT DRAWING HAS BEEN CHECKED AGAINST REQUIREMENTS AS CALLED FOR IN SPECIFICATIONS AND DRAWINGS.

1.2.2. INTERFERENCE DRAWINGS:

1.2.2.1. IN AREAS WHERE SPACE IS LIMITED AND MULTIPLE TRADES ARE INSTALLING SERVICES, COORDINATE INSTALLATION OF SERVICES. PREPARE INTERFERENCE DRAWINGS PRIOR TO CONSTRUCTION TO ENSURE INSTALLATION OF ALL SERVICES IS COORDINATED.

1.2.3. OPERATION AND MAINTENANCE INSTRUCTION MANUALS:

1.2.3.1. PROVIDE PDF COPIES OF COMPLETE OPERATION AND MAINTENANCE INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER THIS CONTRACT. MANUAL TO BE ORGANIZED WITH BOOKMARKS IN A FORMAT TO MATCH THE SPECIFICATION SECTIONS. ONCE MANUAL IS REVIEWED AND ACCEPTED, PROVIDE PDF VERSION ON ELECTRONIC MEDIA

1.2.3.2. MANUALS SHALL INCLUDE THE FOLLOWING INFORMATION:)

1.2.3.3. CONTACT INFORMATION OF CONSULTANTS AND CONTRACTORS

1.2.3.4. COMPLETE SET OF FINAL PROJECT SHOP DRAWINGS

1.2.3.5. CONTROL SHOP DRAWINGS AND OPERATING SEQUENCE, INCLUDING WIRING OF COMPONENTS

1.2.3.6. WIRING DIAGRAM OF CONTROL PANELS

1.2.3.7. OPERATING INSTRUCTIONS, INCLUDING START-UP AND SHUT-DOWN PROCEDURE

1.2.3.8. MAINTENANCE INSTRUCTIONS, INCLUDING PREVENTIVE MAINTENANCE INSTRUCTIONS FOR COMPONENTS OF EQUIPMENT

1.2.3.9. COMPLETE PARTS LIST OF ASSEMBLIES AND THEIR COMPONENT PARTS, SHOWING MANUFACTURER'S NAME, CATALOGUE NUMBER, AND NEAREST REPLACEMENT SOURCE

1.2.3.10. LIST OF RECOMMENDED SPARE PARTS AND QUANTITY OF EACH ITEM TO BE STOCKED

1.2.3.11. FINAL TESTING AND BALANCING REPORT

1.2.3.12. MANUFACTURERS' WARRANTIES AND GUARANTEES

1.2.4. AS-BUILT DRAWINGS:

1.2.4.1. MAINTAIN AN ACCURATE RECORD OF DEVIATIONS AND CHANGES FROM CONTRACT DRAWINGS WITH RED LINE MARKINGS. TRANSFER AS-BUILT MARK-UPS TO DIGITAL DRAWING FORMAT. THIS PROCESS SHOULD BE COMPLETED BEFORE TESTING, BALANCING AND/OR COMMISSIONING. SUBMIT TO THE CONSULTANT WITH THE O&M MANUALS AT COMPLETION OF PROJECT.

1.2.4.2. FORMAT FILES TO MATCH EXACTLY THE LAYERING SYSTEM AND SYMBOLOGY OF THE CONSULTANT. BIND ALL EXTERNAL REFERENCES.

1.2.4.3. THE AS-BUILT DRAWINGS SHALL HAVE A VALUE OF $5,000 UNLESS THE MECHANICAL CONTRACT VALUE IS LESS THAN $100,000 WHICH SHALL HAVE A $3,000 VALUE. ONCE AS-BUILT DRAWINGS HAVE BEEN COMPLETED, SUBMITTED AND REVIEWED, PAYMENT WILL BE RELEASED. THIS VALUE IS NOT INCLUDED IN THE AMOUNT REQUIRED BY THE CONSTRUCTION LIEN ACT.

1.2.4.4. THIS PROJECT UTILIZED THE FOLLOWING DIGITAL FORMAT(S): PDF

1.3. ACCESS DOORS: PROVIDE ACCESS DOOR OF AT LEAST 200 MM x 200 MM (8“ X 8") IN SIZE AS REQUIRED IN WALLS AND CEILINGS TO ENSURE THAT ACCESS IS PROVIDED FOR ALL EQUIPMENT, VALVES OR APPURTENANCES. PROVIDE ACCESS DOORS COMPATIBLE WITH ADJACENT FINISHES AND WHERE APPLICABLE, WITH A FIRE RATING EQUAL TO THE SURFACES IN WHICH INSTALLED. WHERE ACCESS DOOR IS FIRE RATED, DOOR IS TO BE ULC LISTED. MINIMUM 18 GAUGE STEEL. PROVIDE HINGED DOORS WHERE ACCESS DOOR IS 450 MM X 450 MM (18"X18") OR LARGER. PROVIDE POSITIVE LATCHING SYSTEM.

1.4. FIRESTOPPING AND SMOKE SEAL:

1.4.1. PROVIDE ULC LISTED FIRESTOP SYSTEM TO SEAL AROUND ALL MECHANICAL SERVICES WHICH PENETRATE PART OF A BUILDING ASSEMBLY REQUIRED TO HAVE A FIRE RESISTANCE RATING.

1.4.2. SUBMIT DETAILED SHOP DRAWINGS TO THE CONSULTANT FOR REVIEW. INCLUDING:

1.4.3. -MANUFACTURER'S TECHNICAL PRODUCT DATA AND INSTALLATION INSTRUCTIONS FOR EACH SPECIFIC TYPE AND LOCATION OF PENETRATION

1.4.4. -CERTIFICATION THAT PROPOSED FIRESTOPPING MATERIALS AND ASSEMBLIES COMPLY WITH CAN4-S115-M

1.4.5. -ULC LISTINGS WITH COPIES OF ULC DATA SHEETS FOR EACH SPECIFIC TYPE AND LOCATION OF PENETRATION

1.5. MATERIALS AND EQUIPMENT:

1.5.1. EQUALS AND ALTERNATES:

1.5.1.1. USE MATERIALS AND EQUIPMENT AS SPECIFIED HEREIN, OR SPECIFIED EQUIVALENT. DESIGN OF MECHANICAL SYSTEMS HAS BEEN BASED ON FIRST LISTED SUPPLIER AND MODEL NUMBER/SIZE STATED IN EQUIPMENT SCHEDULES.

1.5.1.2. SOME ITEMS OF EQUIPMENT, ONE OR MORE ADDITIONAL NAMES OF ACCEPTABLE EQUAL MANUFACTURERS MAY BE LISTED. THE DESIGN, LAYOUT, SPACE ALLOCATION, CONNECTION DETAILS, ETC., ARE BASED ON THE PRODUCTS NAMED FIRST IN THE DESCRIPTION AND/OR SCHEDULES. THE GENERAL APPROVAL INDICATED BY LISTING THE NAMES OF OTHER EQUAL MANUFACTURERS IS TO ESTABLISH THE QUALITY OF MANUFACTURE ONLY AND IS SUBJECT TO FINAL REVIEW OF SHOP DRAWINGS, PERFORMANCE DATA, TEST REPORTS BY CONSULTANT.

1.5.1.3. SUPPLIERS WISHING TO SUBMIT OTHER ITEMS OF EQUIPMENT FOR APPROVAL AS AN EQUAL TO THOSE SPECIFIED MUST APPLY TO THE CONSULTANT AT LEAST 5 DAYS BEFORE BID CLOSING DATE. REQUESTS MUST BE ACCOMPANIED BY COMPLETE DESCRIPTION AND TECHNICAL DATA ON THE ITEMS PROPOSED. DEVIATIONS FROM THE SPECIFICATIONS MUST BE STATED IN WRITING AT TIME OF APPLICATION FOR APPROVAL.

1.5.1.4. ITEMS OF EQUIPMENT BY MANUFACTURERS, NOT NAMED IN THE SPECIFICATIONS, MAY BE OFFERED AS ALTERNATIVES. PROPOSALS MUST BE ACCOMPANIED BY FULL DESCRIPTIVE AND TECHNICAL DATA, TOGETHER WITH THE STATEMENT OF AMOUNT OF ADDITION OR DEDUCTION FROM THE BASE BID.

1.5.1.5. AFTER EXECUTION OF THE CONTRACT, SUBSTITUTION OF EQUIPMENT WILL NOT BE CONSIDERED.

1.5.1.6. WHERE EQUIPMENT OTHER THAN THE EQUIPMENT USED AS A BASIS FOR DESIGN, LAYOUT AND SPACE ALLOCATION IS USED, PRODUCE AND SUBMIT REVISED LAYOUTS OF EQUIPMENT, PIPES, DUCTS, ETC., IN THE AREAS AFFECTED. SUBMIT THESE DRAWINGS WITH THE SHOP DRAWINGS. FAILURE TO PRODUCE THESE DRAWINGS IS AN INDICATION BY THE CONTRACTOR THAT THEY ARE NOT REQUIRED AND THE ORIGINAL SPACE ALLOCATIONS ARE ADEQUATE FOR THE SUBSTITUTED EQUIPMENT.

2. TESTING AND BALANCING:

2.1. PRESSURE TESTS:

2.1.1. PROVIDE PRESSURE TESTS ON ALL PIPING INCLUDED IN THIS CONTRACT. FURNISH ALL PUMPS, COMPRESSORS, GAUGES AND CONNECTORS NECESSARY FOR TESTS.

2.1.2. CONDUCT HYDROSTATIC TESTS FOR A MINIMUM PERIOD OF 2 HOURS. DURING THIS TIME THE PRESSURE SHALL REMAIN CONSTANT.

2.1.3. CONDUCT FINAL TESTS ON NATURAL OR PROPANE GAS PIPING IN ACCORDANCE WITH REQUIREMENTS OF LOCAL UTILITY OR GOVERNING AUTHORITY.

2.1.4. FORWARD COPIES OF ALL FINAL TESTS ON ALL PRESSURE AND DRAINAGE PIPING TO CONSULTANT.

2.2. AIR BALANCING:

2.2.1. ASSUME RESPONSIBILITY FOR TESTING, BALANCING, AND PLACING ALL AIR HANDLING SYSTEMS IN OPERATION.

2.2.2. RETAIN INDEPENDENT BALANCING FIRM TO BALANCE AIR HANDLING SYSTEMS.

2.2.3. PROVIDE SHEAVES AND PULLEYS AND BELTS AS REQUIRED TO ACHIEVE AIR FLOWS INDICATED. CO-ORDINATE SUPPLY WITH EQUIPMENT MANUFACTURER.

2.2.4. ON COMPLETION OF TESTING AND BALANCING OF ALL SYSTEMS, SUBMIT TO CONSULTANT A PDF REPORT OF FINDINGS, INCLUDING COMPLETE DATA OF FAN PERFORMANCE, STATIC PRESSURES, AIR AND WATER FLOW RATES, FINAL READINGS AT ALL OUTLETS, AND AMPERE READINGS OF ALL MOTORS, TAKEN AT MOTOR TERMINALS WHEN EQUIPMENT IS OPERATING UNDER FULL LOAD CONDITIONS.

2.2.5. SUBMIT WITH EACH COPY OF REPORT, COMPLETE SETS OF DUCT LAYOUT PRINTS NEATLY MARKED IN RED INK, SHOWING ALL LOCATIONS AT WHICH TEST READINGS WERE TAKEN, AIR VOLUME, VELOCITY AND STATIC PRESSURE IN EACH SUPPLY AND RETURN DUCT, AND FINAL READING AT ALL OUTLETS. OBTAIN DUCT LAYOUT PRINTS FOR MARK-UP PURPOSES FROM CONSULTANT..

2.2.6. INSTALLATION TOLERANCES

2.2.6.1. AIR HANDLING SYSTEMS: ±5% OF DESIGN

2.2.6.2. AIR OUTLETS / INLETS: ±10% OF DESIGN

3. MECHANICAL INSULATION:

3.1. WHERE INSULATION THICKNESS IS NOT IDENTIFIED, COMPLY WITH ASHRAE 90.1 REQUIREMENTS.

3.2. ALL PRODUCTS TO HAVE FLAME SPREAD RATING LESS THAN 25 AND SMOKE DEVELOPED CLASSIFICATION LESS THAN 50 IN COMPLIANCE WITH CAN/ULC-S102.

3.3. PROVIDE A CONTINUOUS VAPOUR BARRIER ON ALL COLD SYSTEMS.

3.4. DEFINITIONS:

CONCEALED: INSULATED MECHANICAL SERVICES AND EQUIPMENT IN SUSPENDED CEILINGS AND NON ACCESSIBLE CHASES AND FURRED IN SPACES.

EXPOSED: NOT CONCEALED

3.5. INSULATION TYPES:

3.5.1. PGF - PREFORMED GLASS FIBRE: FIBROUS GLASS SPLIT SECTIONAL PIPE INSULATION CONFORMING TO CAN/ULC C-S702, WITH FACTORY APPLIED VAPOUR BARRIER JACKET TO ASTM C921 AND SELF-SEAL LAP JOINT.

3.5.2. FGF - FLEXIBLE GLASS FIBRE: ASTM C553 FLEXIBLE NON-COMBUSTIBLE BLANKET, WITH FACTORY APPLIED VAPOUR BARRIER JACKET TO ASTM E96/E96M. THERMAL CONDUCTIVITY TO ASTM C518.

3.5.3. RGF - RIGID GLASS FIBRE: ASTM C612 RIGID NON-COMBUSTIBLE BLANKET, WITH FACTORY APPLIED VAPOUR BARRIER JACKET TO ASTM E96/E96M. THERMAL CONDUCTIVITY TO ASTM C518.

3.5.4. CF - CELLULAR FOAM: ASTM C534/C534M, FLEXIBLE, CELLULAR ELASTOMERIC, MOULDED OR SHEET WITH ANTIMICROBIAL COATING. USE WATERPROOF VAPOUR BARRIER ADHESIVE. EXPOSED INSULATION TO HAVE WHITE FINISH.

3.6. PIPING:

3.6.1. DO NOT INSULATE FLANGES OR UNIONS AT CONNECTION TO EQUIPMENT.

3.6.2. VALVE OPERATORS AND BALANCING VALVE TEST PORTS TO BE ACCESSIBLE WITHOUT REMOVAL OF INSULATION.

3.6.3. PIPE INSULATION INSERTS AND SHIELDS: PROVIDE RIGID INSERTS AND SHIELDS AT ALL HANGER SUPPORTS WHERE PIPING IS INSULATED. INSERT THICKNESS TO MATCH INSULATION THICKNESS. INSERT TO BE HYDROUS CALCIUM SILICATE RIGID PIPE INSULATION. INSERT AND SHIELD TO PROTECT BOTTOM HALF OF PIPE. SHIELD TO BE FABRICATED FROM GALVANIZED STEEL. SHIELD COLOUR TO MATCH COLOUR OF INSULATION FINISH. SHIELD AND INSERT LENGTH TO BE AS FOLLOWS:

NOMINAL PIPE SIZE	INSERT LENGTH
MM (IN)	MM (IN)
40-65 (1-1/2 - 2-1/2)	250 (10)
80-150 (3-6)	300 (12)
200-250 (8-10)	400 (14)
>=300 (>=12)	550 (22)

3.6.4. PIPE INSULATION TYPE AND THICKNESS:

3.6.4.1. PLUMBING:

3.6.4.1.1. POTABLE (DOMESTIC) COLD WATER AND CITY WATER (PGF): 25 MM (1”)

3.6.4.1.2. POTABLE (DOMESTIC) HOT WATER (PGF):

<=32 MM (1-1/4”) - 25 MM (1”)

>=40 MM (1-1/2”) - 40 MM (1-1/2”)

3.6.4.1.3. STORM AND SANITARY DRAIN (PGF): 25 MM (1”)

3.6.5. APPLICATION:

3.6.5.1. COMPLETELY INSULATE THE FOLLOWING SYSTEMS:

-POTABLE (DOMESTIC) COLD WATER

-POTABLE (DOMESTIC) HOT WATER

3.6.5.2. SANITARY DRAIN:

3.6.5.2.1. INSULATE HORIZONTAL ABOVE FLOOR SANITARY DRAIN PIPING WITHIN BUILDING.

3.7. SHEET METAL:

3.7.1. EXHAUST AIR DUCTS: EXTERNALLY INSULATE AT LEAST 1,500 MM (5') FROM EXTERIOR WALL / ROOF PENETRATIONS, AND OTHER DUCTS IDENTIFIED ON DRAWINGS.

3.7.2. CONCEALED RECTANGULAR / ROUND DUCTWORK: FLEXIBLE DUCT INSULATION OF 12 KG/M3 (3/4 LB/CU.FT.) DENSITY, MINIMUM 40 MM (1-1/2") THICKNESS, MINIMUM R-VALVE OF R-3.5 WITH REINFORCED FOIL FLAME RESISTANT KRAFT FACING.

3.8. SURFACE FINISHES:

3.8.1. PIPING:

3.8.1.1. EXPOSED INTERIOR PIPING: FINISH EXPOSED INSULATED PIPING, VALVES AND FITTINGS WITH PVC JACKETING. PVC MUST HAVE ATTAINED 25/50 FIRE RATING, BASED ON CAN/ULC-S102-M88 TESTING.

4. PIPING SYSTEMS:

4.1. GENERAL:

4.1.1. EXPANSION AND CONTRACTION: INSTALL ALL PIPING SO AS TO BE FREE FROM STRAIN AND DISTORTION DUE TO EXPANSION AND CONTRACTION AS GOVERNED BY REQUIREMENTS OF ANSI B31.1, EXCEPT AS HEREINAFTER MODIFIED. ALLOW FOR EXPANSION AND CONTRACTION BY OFFSETS, EXPANSION U-BENDS OR LOOPS. DO NOT USE EXPANSION JOINTS OF ANY TYPE UNLESS SPECIFICALLY INDICATED ON DRAWINGS.

4.1.2. PIPING SUBJECT TO FREEZING:

4.1.2.1. WHERE HORIZONTAL OR VERTICAL PIPING IS RUN ALONG AN OUTSIDE BUILDING WALL, AND CONCEALED IN A PIPE SPACE, CIRCULATION OF INTERIOR AIR SHALL BE MAINTAINED IN THE PIPE SPACE BY MEANS OF AN AIR GRILLE(S), LOCATED AT THE TOP AND THE BOTTOM OF THE PIPE SPACE, FACING THE INTERIOR OF THE BUILDING.

4.1.2.2. WHERE HORIZONTAL PIPING IS RUN IN A CEILING SPACE UNDER UNINSULATED ROOF, THE INSULATED PIPE SHALL BE ENCASED IN SLAB INSULATION ON BOTH SIDES AND TOP AND CIRCULATION OF INTERIOR AIR SHALL BE MAINTAINED IN THE ENCASEMENT BY MEANS OF AIR GRILLES, LOCATED IN THE CEILING BELOW, FACING DOWN INTO THE INTERIOR OF THE BUILDING. THE SPACING OF GRILLES SHALL NOT BE LESS THAN 300 MM (12”) O.C.

4.1.3. LINES, GRADES AND SLOPES:

4.1.3.1. INSTALL LIQUID PIPING FREE OF POCKETS AND PITCH TO DRAIN, AT LOW POINTS IN PIPING, WITH VALVES OR TRAPS INSTALLED AS REQUIRED FOR DRAINAGE OF THE PIPING.

4.1.3.2. INSTALL PIPING TO FOLLOWING SLOPES:

4.1.3.3. DRAINAGE PIPING: 1:50 ON DRAINS OF NPS 3 SIZE AND LESS AND 1:100 ON DRAINS OF NPS 4 AND LARGER.

4.1.3.4. POTABLE (DOMESTIC) WATER PIPING: PITCH TO LOW POINTS SO THAT ALL PIPING MAY BE COMPLETELY DRAINED.

4.1.4. UNIONS OR FLANGES - PROVIDE IN THE FOLLOWING LOCATIONS:

4.1.4.1. FOR BY-PASSES AROUND EQUIPMENT, CONTROL VALVES, DEVICES IN PIPING SYSTEMS, AND ELSEWHERE INDICATED ON DRAWINGS.

4.1.4.2. AT CONNECTIONS TO EQUIPMENT (LOCATE BETWEEN SHUT-OFF VALVE AND EQUIPMENT).

4.1.4.3. PROVIDE DIELECTRIC UNIONS, OR ISOLATING TYPE COMPANION FLANGES, AT ALL CONNECTIONS BETWEEN COPPER TUBING AND FERROUS PIPING.

4.1.5. SLEEVES:

4.1.5.1. INSTALL SLEEVES WHERE PIPING PASSES THROUGH FOUNDATIONS, ABOVE GRADE FLOORS, AND WALLS. FABRICATE SLEEVES OF SCHEDULE 40 BLACK STEEL PIPE OR TYPE "K" COPPER TUBING.

4.1.5.2. SLEEVES FOR PIPING PASSING THROUGH ROOFS WILL BE SUPPLIED AND INSTALLED UNDER THIS DIVISION.

4.1.5.3. MAKE SLEEVES LARGE ENOUGH TO PASS FULL THICKNESS OF PIPE COVERING WHERE SAME IS USED, AND WITH SUFFICIENT CLEARANCE BETWEEN PIPE AND SLEEVE TO ALLOW FOR ANY LATERAL MOVEMENT OF PIPING DUE TO EXPANSION AND CONTRACTION.

4.1.5.4. FILL SLEEVES FOR FUTURE USE WITH LIME MORTAR.

4.1.6. ESCUTCHEON PLATES: PROVIDE ESCUTCHEON PLATES ON BARE PIPING PASSING THROUGH FINISHED WALLS OR FLOORS.

4.1.7. VALVES: PROVIDE DRAIN VALVES WITH HOSE THREAD OUTLET CONNECTION, OR VALVE WITH LONG NIPPLE ON OUTLET, AT ALL LOW POINTS OF EACH WATER SYSTEM, AND ABOVE ALL RISER OR BRANCH STOP VALVES, FOR PROPER DRAINAGE OF PIPING.

4.1.8. PIPE IDENTIFICATION:

4.1.8.1. LABEL PIPING INSTALLED UNDER THIS DIVISION TO INDICATE CONTENT AND DIRECTION OF FLOW. INCLUDE OPERATING PRESSURE OR VACUUM, AS APPLICABLE.

4.1.8.2. ALL LABELS SHALL BE OF SUFFICIENT WIDTH TO OVERLAP ITSELF.

4.1.8.3. PROVIDE LABELS OF PLASTIC COATED TAPE, WITH SELF-ADHESIVE BACKING SURFACE. FOR INSTALLATION ON INSULATED PIPE, PROVIDE ADHESIVE SUITABLE FOR THIS APPLICATION. CONFORM WITH CAN/CGSB-24.3 AND/OR OWNER STANDARDS FOR PRIMARY LABEL COLOUR, AND WITH LEGEND AND DIRECTION ARROWS IN BLACK. PRINT LEGEND IN FULL WHEREVER FEASIBLE, OR A RECOGNIZED ABBREVIATION OF SERVICE INVOLVED.

4.1.8.4. LOCATE LABELS AS FOLLOWS: AT EVERY END OF EVERY PIPE RUN, ADJACENT TO VALVE OR ITEM OF EQUIPMENT SERVICES. ON EACH EXPOSED PIPE PASSING THROUGH WALL, PARTITION OR FLOOR AT INTERVALS OF 15 M (50'-0") ALONG EVERY EXPOSED PIPE RUN EXCEEDING 15 M (50'-0") IN LENGTH. AT EVERY ACCESS POINT ON CONCEALED PIPING.

4.2. HANGERS AND SUPPORTS:

4.2.1. GENERAL:

4.2.1.1. PIPE HANGERS & SUPPORTS TO CSA B214 & MSS SP-58.

4.2.1.2. SUPPORT OR SUSPEND ALL PIPING WITH NECESSARY HANGERS, STRUCTURAL SUPPORTS AND/OR BRACKETS AS REQUIRED, TO PREVENT SAGGING, WARPING AND VIBRATION.

4.2.1.3. DO NOT ALLOW LOADS, OF ANY NATURE, TO BE TRANSMITTED THROUGH PIPING CONNECTIONS TO EQUIPMENT.

4.2.1.4. PROVIDE SUITABLY DAMPENED SPRING HANGERS FOR FIRST THREE SUPPORTS FROM EQUIPMENT CONNECTION ON PIPING SUBJECT TO EXCESSIVE MOVEMENT.

4.2.1.5. DO NOT HANG ANY PIPE, FROM ANOTHER PIPE OR FROM ROOF DECK, UNLESS SPECIFICALLY INDICATED ON DRAWINGS.

4.2.1.6. PROVIDE DIELECTRIC SEPARATION AS REQUIRED.

4.2.2. HANGERS:

4.2.2.1. FOR ALL INSULATED PIPING UP TO NPS 4, CARRYING LIQUIDS AT TEMPERATURES 10.5°C (51°F) AND HIGHER, USE STANDARD WEIGHT CLEVIS HANGERS.

4.2.2.2. FOR INSULATED PIPING OF NPS 4 DIA. AND LARGER, CARRYING LIQUIDS AT TEMPERATURES 10.5°C (51°F) OR HIGHER, USE ADJUSTABLE ROLLER TYPE HANGERS WITH LOCKNUTS. SUPPORT ROLLERS AT BOTH ENDS WITH 2 ADJUSTABLE RODS WITH LOCKNUTS.

4.2.2.3. FOR INSULATED PIPING CARRYING LIQUIDS AT A TEMPERATURE OF 10°C (50°F) OR LESS, USE ELONGATED CLEVIS TYPE HANGERS.

4.2.2.4. PROVIDE INSULATION PROTECTION BEARING PLATES AT ALL HANGERS AND SUPPORTS FOR ALL INSULATED PIPING.

4.2.2.5. FOR NON-INSULATED PIPING USE CLEVIS TYPE OF WROUGHT STEEL CONSTRUCTION.

4.2.2.6. FOR COPPER TUBING PROVIDE COPPER COATED HANGERS.

4.2.2.7. ATTACH HANGER RODS, TO BUILDING STRUCTURE, BY MEANS OF MALLEABLE IRON BEAM CLAMPS OR CONCRETE INSERTS

4.2.3. HANGER SPACING:

4.2.3.1. FOR HORIZONTAL RUNS OF PLUMBING AND DRAINAGE PIPING COMPLY WITH HANGER SPACING REQUIREMENTS OF BUILDING CODE.

4.2.3.2. FOR HORIZONTAL RUNS OF BLACK OR GALVANIZED STEEL PIPE, OTHER THAN FOR PLUMBING SERVICE, COMPLY WITH MSS SP-58 TABLES 3 & 4.

4.2.4. FOR HORIZONTAL RUNS OF COPPER TUBING FOR SERVICES OTHER THAN PLUMBING, DO NOT EXCEED 1.8 M (6'.) BETWEEN HANGERS UNLESS SPECIFICALLY NOTED.

4.2.5. FOR HORIZONTAL RUNS OF PIPING FABRICATED OF PVC FOR SERVICES OTHER THAN PLUMBING, DO NOT EXCEED 1.22 M (48”)

4.2.6. IN A HORIZONTAL RUN, PEX TUBING SHALL BE SUPPORTED AT INTERVALS NOT EXCEEDING 800 MM (32”), UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER.

4.3. MATERIALS OF CONSTRUCTION:

4.3.1. SANITARY AND INDIRECT DRAIN (INCLUDING VENTING):

4.3.2.1. ALL INDICATED PIPE SIZES ARE REPRESENTATIVE OF THE INSIDE DIAMETER OF THE PIPE AND MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS.

4.3.2.1. REFERENCE STANDARDS:

4.3.2.1.1. CAST IRON: TO CSA B70. MECHANICAL FITTINGS TO CSA B602.

4.3.2.1.2. COPPER, DWV: HARD DRAWN COPPER DRAINAGE TUBE CONFORMING TO ASTM B 306 WITH WROUGHT COPPER OR CAST BRASS SOLDER JOINT DRAINAGE FITTINGS TO ASME B16.29 OR ASME B16-29.

4.3.2.1.3. PVC, DWV: TO CAN/CSA-B182.1 OR B182.2. RUBBER RING GASKETS INTEGRAL WITH BELL OR SOLVENT WELD TO ASTM D2564.

4.3.2.1.4. PVC, SYSTEM 15: TO CSA B182.2. FLAME SPREAD RATING NOT GREATER THAN 25 PER CAN/ULC 102.2 WITH CERTIFICATION LABEL.

4.3.2.1.5. PVC, XFR: TO CSA B182.2. FLAME SPREAD RATING NOT GREATER THAN 25 & SMOKE DEVELOPED CLASSIFICATION NOT GREATER THAN 50 PER CAN/ULC 102.2 WITH CERTIFICATION LABEL.

4.3.2.1.6. POLYETHELYNE: TO CSA B137.1. BUTT FUSION FITTINGS TO ASTM D3261.

4.3.2.1.7. GALVANIZED STEEL: TO ASTM A52/A52M.

4.3.2.2. APPLICATION:

4.3.2.2.1. BURIED SECTIONS WITHIN BUILDING AREA AND TO 1.5M (5'-0") OUTSIDE BUILDING

4.3.2.2.2. PIPING 200 MM (8") AND SMALLER:

4.3.2.2.3. CAST IRON SOIL PIPE AND FITTINGS OR

4.3.2.2.4. PVC DWV

4.3.2.2.5. PIPING CAST INTO CONCRETE RAFT SLAB SHALL BE PVC- SYSTEM 15

4.3.2.2.6. ABOVE GRADE:

4.3.2.2.6.1. PIPING 75 MM (3") AND SMALLER: DWV COPPER

4.3.2.2.6.2. PIPING 100 MM (4") AND LARGER: CAST IRON

4.3.2.2.6.3. PIPING 150 MM (6") AND SMALLER: PVC DWV

4.3.2.2.7. NON-COMBUSTIBLE BUILDINGS:

4.3.2.2.7.1. LOW-RISE, NON-PLENUM SPACES: PVC, SYSTEM 15

4.3.3. POTABLE (DOMESTIC) HOT AND COLD WATER:

4.3.3.1. ALL INDICATED PIPE SIZES ARE REPRESENTATIVE OF THE INSIDE DIAMETER OF THE PIPE AND MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS.

4.3.3.1. REFERENCE STANDARDS:

4.3.3.1.1. ALL MATERIALS TO BE NSF/ANSI 61 & 372 CERTIFIED.

4.3.3.1.2. COPPER:

4.3.3.1.2.1. PIPING - SEAMLESS WATER TUBE TO ASTM B88

4.3.3.1.2.2. FITTINGS:

SOLDER JOINT FITTINGS TO ASME B16.18 (CAST) OR B16.22 (WROUGHT) OR

COLD PRESS FITTINGS WITH EPDM SEALING ELEMENT TO ASME B16.18 OR ASME B16.22. INSTALLED USING PROPER TOOL, ACTUATOR, JAWS, AND RINGS AS INSTRUCTED BY THE PRESS FITTING MANUFACTURER.

4.3.3.1.3. PEX-A:

4.3.3.1.3.1. CROSSLINKED POLYETHYLENE PIPING TO CAN/CSA-B137.5. PRESSURE AND TEMPERATURE RATINGS: 93°C (200°F) AT 80 PSI (551 KPA), 82°C (180°F) AT 100 PSI (689 KPA).

50 MM (2") AND SMALLER - CAN/ULC-S102.2 LISTED TO A MAXIMUM OF 25 FLAME SPREAD / 50 SMOKE DEVELOPED WITH NO LIMITATIONS ON SPACING.

65 MM (2-1/2") AND LARGER - CAN/ULC-S102.2 LISTED TO A MAXIMUM OF 25 FLAME SPREAD / 50 SMOKE DEVELOPED WITH RATED FIBERGLASS INSULATION.

4.3.3.1.3.2. SEAL PENETRATIONS AT FIRE SEPARATIONS PER CAN/ULC-S115.

4.3.3.1.3.3. PIPING WITHIN A FIRE SEPARATION PER CAN/ULC-S101.

4.3.3.1.3.4. ALL FITTINGS BY TUBING MANUFACTURER.

4.3.3.1.3.5. 25 YEAR CSA SYSTEM WARRANTY (INCLUDING CONSEQUENTIAL) FROM INSTALLATION DATE.

4.3.3.1.4. PVC: TO CSA B137.3 OR CSA B137.2. MINIMUM PRESSURE RATING 1,100 KPA (160 PSI).

4.3.3.2. APPLICATION:

4.3.3.2.1. BURIED PIPING 75 MM (3") AND SMALLER:

4.3.3.2.1.1. TYPE "K" SOFT ANNEALED COPPER TUBING WITH NO JOINTS PERMITTED BELOW GRADE. BEND TUBING USING APPROVED TUBE BENDER.

4.3.3.2.1.2. USE TYPE "K" SOFT ANNEALED COPPER TUBING FOR TRAP SEAL PRIMER PIPING TO TRAPS INSTALLED IN CONCRETE FLOORS.

4.3.3.2.1.3. PVC WITH NO JOINTS BELOW GRADE. COLD WATER ONLY.

4.3.3.2.2. ABOVE GROUND PIPING 75 MM (3") AND SMALLER:

4.3.3.2.2.1. TYPE "L" HARD DRAWN COPPER TUBING. PROVIDE SOLDER TO THREADED ADAPTERS AT SCREWED VALVES OR EQUIPMENT.

4.3.3.2.2.2. PEX-A FOR 38 MM (1-1/2") AND SMALLER (ON COMPLETION OF INSTALLATION THE SYSTEM SHALL BE CHARGED WITH POTABLE WATER TO A PRESSURE WHICH MEETS LOCAL PLUMBING CODES. THE SYSTEM SHALL REMAIN AT THIS PRESSURE FOR A MINIMUM OF 24 HOURS TO ENSURE SYSTEM INTEGRITY.) PROVIDE COPPER STUB-OUT ELBOWS AT EACH FIXTURE CONNECTION. STUB-OUT TO BE MANUFACTURED FROM SEAMLESS COPPER TUBING WITH A MACHINED ASTM F-1807 PEX BARB CONNECTION AND SPIN SEALED OUTLET. ONLY EXPANSION JOINTS AND FITTINGS WILL BE PERMITTED FOR USE IN INSTALLATION. FOLLOW MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

4.3.3.2.2.3. CPVC: BUILDINGS OF NON-COMBUSTIBLE CONSTRUCTION, HIGH-RISE BUILDINGS AND IN RETURN AIR PLENUMS. FIRESTOPPING SYSTEMS SHALL BE LISTED UNDER CAN/ULC S115 AND TESTED WITH A PRESSURE DIFFERENTIAL OF 50 PA.

5. PLUMBING SYSTEM:

5.1. REFERENCES STANDARDS:

5.1.1. CONFORM TO ALL APPLICABLE CODES INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

5.1.1.1. CSA-B64.10: SELECTION AND INSTALLATION OF BACKFLOW PREVENTERS

5.2. VENTING: PLUMBING VENTING MAY NOT BE SHOWN ON DRAWINGS. PROVIDE A COMPLETE PLUMBING VENTING SYSTEM FOR ALL PLUMBING FIXTURES SHOWN, IN ACCORDANCE WITH OBC SECTION 7.5.

5.3. STERILIZATION OF POTABLE (DOMESTIC) WATER SYSTEMS:

5.3.1. FLUSH EACH SYSTEM, AFTER COMPLETION, BY ALLOWING FULL FLOW OF WATER THROUGH SYSTEM FOR A PERIOD OF FIFTEEN MINUTES, OR LONGER WHEN DIRECTED BY CONSULTANT.

5.3.2. AFTER FLUSHING OF THE SYSTEM IS COMPLETED, PROVIDE A 24 HOUR CONTACT STERILIZATION TREATMENT BY TREATING THE WATER WITH 50 PPM OF CHLORINE AS RECOMMENDED IN AWWA SPECIFICATION C-651. AFTER STERILIZATION PERIOD HAS ELAPSED, FLUSH SYSTEM TO REDUCE CHLORINE CONTENT TO AN ACCEPTABLE LEVEL.

5.4. CONNECTIONS SERVICES:

5.4.1. WATER SERVICE: MAKE ARRANGEMENTS WITH LOCAL MUNICIPALITY FOR INSTALLATION OF WATER METER. PAY FOR COSTS LEVIED BY MUNICIPALITY FOR PROVISION, INSTALLATION AND CONNECTION OF THIS SERVICE.

5.5. BACKFLOW PREVENTERS:

5.5.1. DOUBLE CHECK VALVE TYPE (DCVA): DOUBLE CHECK VALVE ASSEMBLY, TESTED AND CERTIFIED UNDER ASSE STANDARD 1012 AND CSA B64.5, WITH BRASS OR CAST EPOXY COATED BODY AND STAINLESS STEEL WORKING PARTS, STRAINER AND PRIMARY AND SECONDARY CHECK VALVES. CHECK VALVE SEATS AND DISKS TO BE REPLACEABLE.

5.6. PLUMBING FIXTURES:

5.6.1. PROVIDE CSA COMPLIANT PLUMBING FIXTURES.

5.6.2. PROVIDE PLUMBING FIXTURES AS INDICATED IN SCHEDULE ON DRAWINGS.

5.6.3. CAULK ALL AROUND BASES OF MOP SERVICE SINKS, BUILT-IN BATHTUBS, AND OTHER BUILT-IN FIXTURES.

5.7. VALVES:

5.7.1. SUBMIT SHOP DRAWINGS FOR ALL VALVES.

5.7.2. POTABLE (DOMESTIC) WATER:

5.7.2.1. REFERENCE STANDARDS:

5.7.2.1.1. LEAD FREE, 0.25% CONTENT PER NSF-61/372

5.7.2.1.2. BRONZE TO ASTM C89530

5.7.2.1.3. BRASS TO ASTM C46750

5.7.2.1.4. CAST IRON TO ASTM A126

5.7.2.1.5. STAINLESS STEEL TO ASTM A351

5.7.2.1.6. CPVC RATED TO 1,600 KPA (232 PSI) AT 23°C (73°F)

5.7.2.1.7. ALL PRESSURE RATINGS, SIZES TO MSS SP-25

5.7.2.2. ISOLATION / SHUT-OFF: 3 PIECE BRASS OR BRONZE BODY, 1,034 KPA (150 PSI) 60 WOG RATING, FULL PORT, STAINLESS STEEL BALL, LOCKING LEVER HANDLE WITH INSULATION STEM EXTENSION. SOLDERED, THREADED OR PEX CONNECTIONS. MANUFACTURED TO MSS SP-110.

5.7.2.3. CHECK: Y PATTERN SWING TYPE, BRONZE BODY / TRIM. 860 KPA (125 PSI) 200 WOG RATING TO MSS SP-80.

5.7.2.4. CHECK (PUMP DISCHARGE): SPRING LOADED SWING TO MSS SP-71, CLASS 125.

5.7.2.5. THROTTLING: GLOBE, BRONZE BODY, RISING STEM, 800 KPA (125 PSIG) / 200 WOG. MANUFACTURED TO MSS SP-110.

5.7.2.6. RELIEF VALVES: ASME RATED CAPABLE OF RELIEVING FLOW AT 25% ABOVE WORKING PRESSURE. BODY CONSTRUCTION AND TYPE OF TRIM SHALL BE SUITABLE FOR SPECIFIC SERVICE.

5.8. PLUMBING SPECIALTIES:

5.8.1. FLOOR DRAINS: PROVIDE FLOOR DRAIN SIZES AS INDICATED ON DRAWINGS, WITH TAPPED PRIMER CONNECTION IN DRAIN BODY AND TO CONFORM WITH CODE REQUIREMENTS. PROVIDE EACH FLOOR DRAIN WITH DEEP SEAL "P" TRAP UNLESS OTHERWISE INDICATED.

5.8.2. CLEANOUTS (CO):

5.8.2.1. PROVIDE CLEANOUTS IN DRAINAGE PIPING AT LOCATIONS INDICATED ON DRAWINGS, AT BASE OF EACH VERTICAL STACK OR RAINWATER LEADER AND AS CLOSE AS POSSIBLE TO WHERE THE DRAINAGE PIPING LEAVES THE BUILDING, AS REQUIRED TO COMPLY WITH BUILDING CODE.

5.8.2.2. WHERE CLEANOUTS ARE CONCEALED IN WALLS, PROVIDE AN ACCESS COVER ON WALL. TYPE OF COVER TO SUIT WALL SURFACE AND CONSTRUCTION.

5.8.3. TRAP SEAL PRIMER: PROVIDE LEAD FREE TRAP SEAL PRIMER. PRIMER TO BE CAPABLE OF BEING INSTALLED ON PIPING UP TO 40 MM (1-1/2”). PROVIDE SHUTOFF VALVE UPSTREAM AND UNION DOWNSTREAM OF PRIMER. TRAP GUARD MAY BE USED IN LIEU OF TRAP SEAL PRIMER..

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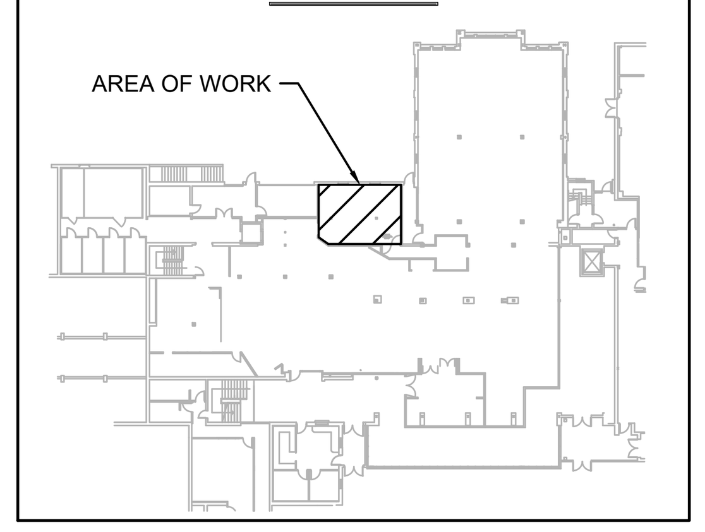
KEYPLAN



REVISIONS

NO.	ISSUED FOR	DATE
00	90% CLIENT REVIEW	23.09.15
01	FINAL CLIENT REVIEW	23.12.01
02	FINAL CLIENT REVIEW	23.12.22
03	PERMIT	24.01.16
04	CLIENT REVIEW	24.01.26
05	PERMIT AND TENDER	24.02.26

NORTH

DESIGN	BCD	DRAWN	BCD
CHECKED	JRG	REVIEWED	JRG

PROJECT

WILFRID LAURIER UNIVERSITY DISH ROOM

ADDRESS

75 UNIVERSITY AVE W, WATERLOO, ON N2L 3C5

PROJECT NO.

CE-5716

DRAWING TITLE

SPECIFICATIONS - MECHANICAL

DRAWING NUMBER

M5 OF 6

6. AIR DISTRIBUTION SYSTEM:

6.1. DUCTWORK:

6.1.1. GENERAL:

6.1.1.1. PROVIDE DUCTWORK CONSTRUCTED TO SMACNA 250 PA (1" W.G.) PRESSURE CLASSIFICATION & SEAL CLASS A. FOLLOW ALL OF THE LATEST SMACNA REQUIREMENTS.

6.1.1.2. SEAL ALL DUCT JOINTS AND CONNECTIONS TO DIFFUSERS AND EQUIPMENT WITH HIGH VELOCITY WATER BASED DUCT SEALER.

6.1.1.3. PROVIDE DUCTS OF SIZES INDICATED ON DRAWINGS. WHERE DUCTS ARE TO BE FURNISHED WITH ACOUSTIC DUCT INSULATION, ADJUST DUCT SIZE TO ACCOMMODATE THICKNESS, WITH CLEAR INSIDE DIMENSIONS AS INDICATED ON DRAWINGS.

6.1.1.4. CONTINUOUSLY SOLDER OR SEAL JOINTS IN EXTERIOR AIR INTAKE DUCTS AND PLENUMS TO PREVENT DRIPPING OF MOISTURE.

6.1.1.5. PROVIDE DUCTWORK OF GALVANIZED STEEL SHEET UNLESS INDICATED OTHERWISE.

6.1.1.6. DUCTWORK ASPECT RATIOS CAN BE ADJUSTED TO A MAXIMUM OF 4:1 WHILE KEEPING AT LEAST THE SAME CROSS SECTIONAL AREA, TO AVOID INTERFERENCES, AS REQUIRED.

6.1.2. RECTANGULAR DUCTWORK:

6.1.2.1. FOR LONGITUDINAL JOINTS ON RECTANGULAR DUCTWORK, FURNISH PITTSBURGH LOCK JOINTS TIGHTLY CLOSED ALONG FULL LENGTH OF SEAM.

6.1.2.2. CROSS-BREAK FLAT SURFACES BETWEEN JOINTS, OR BETWEEN JOINTS AND INTERMEDIATE REINFORCEMENTS, TO PREVENT VIBRATION OR BUCKLING.

6.1.2.3. WHERE ELBOWS ARE INDICATED AS SQUARE TYPE, PROVIDE AIR TURNING VANES OF DOUBLE BLADE CONSTRUCTION.

6.1.3. FLEXIBLE TYPE ROUND DUCTWORK:

6.1.3.1. FURNISH FLEXIBLE TYPE ROUND DUCTWORK BETWEEN TRUNK SUPPLY DUCT AND CEILING DIFFUSERS AND WHERE INDICATED ON DRAWINGS (MAXIMUM 1,500 MM (5') LENGTH). REFER TO DETAIL ON DRAWING.

6.1.3.2. PROVIDE FLEXIBLE DUCT OF POLYMERIC LINER BONDED TO WIRE SPIRAL. WHERE INSTALLED IN CEILING SPACE USED AS A RETURN PLENUM, DUCTS SHALL MEET BUILDING CODE FLAME SPREAD AND SMOKE DEVELOPMENT REQUIREMENTS.

6.1.3.3. FLEXIBLE TYPE ROUND DUCTWORK EXPOSED TO VIEW IS NOT ACCEPTABLE.

6.1.4. DISHWASHER EXHAUST DUCTWORK: FABRICATE EXHAUST DUCTWORK FROM DISHWASHER UNIT OR HOOD THROUGH EXHAUST FAN TO ATMOSPHERE, INCLUDING FIRE DAMPERS, FROM 0.5 MM (26 GA) STAINLESS STEEL SHEET TYPE 304 TO ASTM A 167-99 WITH 2B FINISH. FURNISH DRIVE SLIP, S-SLIP OR 25 MM (1") POCKET SLIP TRANSVERSE JOINTS AT 2,400 MM (8'-0") OC. FURNISH PITTSBURGH SEAM OR DOUBLE SEAM LONGITUDINAL JOINTS. BRAZE ALL JOINTS IN BOTTOM SECTIONS OF HORIZONTAL DUCTWORK.

6.1.5. SUPPORTS AND HANGERS:

6.1.5.1. RECTANGULAR DUCTWORK:

6.1.5.1.1. FOR DUCTS UP TO 760 MM (30") WIDE: FURNISH STRAP HANGERS OF GALVANIZED SHEET STOCK WITH EDGES FOLDED OVER. BEND STRAP HANGER AROUND BOTTOM OF DUCT FOR MINIMUM OF 38 MM (1-1/2") AND ATTACH TO SIDES AND BOTTOM OF DUCT.

6.1.5.2. ROUND DUCTWORK:

6.1.5.2.1. FOR DUCTS UP TO 900 MM (36") DIAMETER: FURNISH STRAP BAND AND HANGER OF 25 MM (1") X 20 GA. GALVANIZED SHEET STOCK WITH EDGES FOLDED OVER. BAND IS TO FIT TIGHT TO DUCT ALL AROUND AND CONNECT TO HANGER STRAP WITH LOAD RATED FASTENER.

6.2. DIFFUSERS, REGISTERS AND GRILLES:

6.2.1. REFER TO SCHEDULE AND TAGS ON DRAWINGS FOR ACCESSORIES, NECK SIZE, DIMENSIONS AND CAPACITY.

6.2.2. COORDINATE PLACEMENT OF DIFFUSERS, REGISTERS AND GRILLES IN CEILINGS WITH ELECTRICAL AND CEILING INSTALLATION TRADES AND EXACT LOCATION TO FINAL APPROVAL OF CONSULTANT.

6.2.3. PROVIDE FRAME ACCESSORIES AS REQUIRED TO SUIT CEILING AND WALL CONSTRUCTION. COORDINATE WITH ARCHITECTURAL DRAWINGS.

6.3. SHEET METAL SPECIALTIES:

6.3.1. BALANCING DAMPERS:

6.3.1.1. LOCKING QUADRANT BALANCING DAMPERS, MANUALLY OPERATED OPPOSED BLADE TYPE, OR BUTTERFLY BLADE TYPE, FABRICATED FROM GALVANIZED STEEL SHEET. PROVIDE WHERE INDICATED ON DRAWINGS AND AS REQUIRED TO ALLOW FOR SYSTEM BALANCING.

6.3.2. ACCESS DOORS: PROVIDE ACCESS DOORS IN DUCTWORK AND PLENUMS TO ALLOW SERVICING, MAINTENANCE AND INSPECTION OF CONTROL DAMPERS, FIRE DETECTORS, BOTH SIDES OF FIRE AND FIRE/SMOKE DAMPERS, CONTROL ELEMENTS, BEARINGS AND AS INDICATED ON DRAWINGS. FURNISH ACCESS DOORS AT LEAST 300 MM X 150 MM (12" X 6") UNLESS DUCT DIMENSIONS PREVENT.

6.3.3. FLEXIBLE DUCT CONNECTIONS: 75 MM (3") WIDE LISTED FIRE RETARDENT NEOPRENE COATED WOVEN GLASS FIBRE FABRIC TO NFPA 701, CRIMPED INTO 75 MM (3') 24 GA. (0.6MM) GALVANIZED STEEL EDGING STRIPS. MANUFACTURED TO SMACNA STANDARDS

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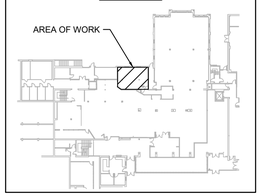

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NORTH

LICENSED PROFESSIONAL ENGINEER
J. Gordon
24.02.26
PROVINCE OF ONTARIO

DESIGN	BCD	DRAWN	BCD
CHECKED	JRG	REVIEWED	JRG

PROJECT
WILFRID LAURIER
UNIVERSITY DISH ROOM

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PROJECT NO.
CE-5716

DRAWING TITLE
SPECIFICATIONS CONT'D -
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DRAWING NUMBER
M6 OF 6