

MECHANICAL SPECIFICATION

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

MECHANICAL SCOPE OF WORK

1. INCLUDE IN MECHANICAL SECTION, PROVISION OF LABOUR, NEW MATERIALS, TOOLS, TRANSPORTATION, SERVICES AND FACILITIES FOR A COMPLETE MECHANICAL INSTALLATION. THE INSTALLATION SHALL BE LEFT COMPLETE IN ALL RESPECTS AND READY FOR OPERATION. FINAL INSTALLATION SHALL BE INSTALLED TO COMPLETE SATISFACTION OF THE RESPONSIBLE PROFESSIONAL ENGINEER.
2. THE MECHANICAL SCOPE OF WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING PROVISION:
 - 2.1. GENERAL:
 - 2.1.1. FAMILIARIZE CREW WITH SITE IN ORDER TO DETERMINE APPROPRIATE LOCATIONS, SITE CONDITIONS, ETC. THAT MAY AFFECT WORK.
 - 2.1.2. WORK MAY NEED TO BE PERFORMED AT NON-STANDARD HOURS. DETERMINE SCHEDULE WITH CITY REPRESENTATIVE.
 - 2.1.3. PROVISION OF O&M MANUALS AND TRAINING OF CITY PERSONNEL.
 - 2.1.4. RECORD DRAWINGS.
 - 2.1.5. PROVISION OF FIRE STOPPING AT ALL PIPE, DUCT AND CONDUIT WIRING PENETRATIONS INSTALLED BY THIS TRADE (ONLY).
 - 2.2. PLUMBING:
 - 2.2.1. PROVISION OF ALL PIPING, FIXTURES, PLUMBING BRASS, PIPE FITTINGS, LABOR, INSULATION AND MISCELLANEOUS MATERIALS AS REQUIRED TO COMPLETE THE PROJECT.
 - 2.2.2. PROVISION OF ALL DOMESTIC HOT WATER HEATERS, CIRCULATION PUMPS, AND ASSOCIATED PIPING.
 - 2.3. HVAC
 - 2.3.1. PROVISION OF ALL AIR HANDLING EQUIPMENT, FANS, DUCTWORK, CONTROL/BALANCE FITTINGS, INSULATION, GRILLES/REGISTERS/DIFFUSERS/AOUVERS, FIRE DAMPERS, LABOR AND MISCELLANEOUS MATERIALS AS REQUIRED TO COMPLETE THE PROJECT.
 - 2.3.2. PROVISION OF TAB REPORTS INCLUDING FIRE DAMPER TESTING, CERTIFICATION AND AIR FLOWS. AND PUMP PERFORMANCE.
 - 2.4. CONTROLS
 - 2.4.1. PROVISION OF COMPLETE ELECTRONIC CONTROLS AS DESCRIBED.
 - 2.4.2. COORDINATION OF ALL CONTROL INTERFACE AND POWER REQUIREMENTS WITH ELECTRICAL SUB CONTRACTOR.

GENERAL CONDITIONS

1. PROVIDE ALL LABOUR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHOWN ON DRAWINGS AND AS SPECIFIED HEREIN.
2. ALL NECESSARY PERMITS SHALL BE OBTAINED AND ALL FEES SHALL BE PAID TO CARRY OUT THE SPECIFIED WORK.
3. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF COMPLETED WORK ACCEPTANCE BY THE CITY. SUBMIT DOCUMENTATION IDENTIFYING ADDITIONAL EQUIPMENT WARRANTY COVERAGE AND TIME FRAMES.
4. ALL WORK SHALL COMPLY IN EVERY RESPECT WITH ALL NATIONAL, PROVINCIAL AND LOCAL CODES AND BY-LAWS, WHICH SHALL BE CONSIDERED PART OF THIS SPECIFICATION. IN THE CASE OF CONFLICTING REQUIREMENTS, BE GOVERNED BY THE MOST STRINGENT REGULATIONS.
5. ALL CUTTING, PATCHING, FLASHING FOR WORK AS REQUIRED HEREIN SHALL BE BY THE GENERAL CONTRACTOR.
6. THE MECHANICAL SUB CONTRACTOR SHALL INSTANT PLUMBING, HEATING, VENTILATION, AIR CONDITIONING, AND SPRINKLER SYSTEMS IN COMPLETE ACCORDANCE WITH THE RECOMMENDATIONS OF THE NATIONAL/PROVINCIAL BUILDING CODE, ASHRAE, SMACNA LATEST EDICTION DUCT STANDARDS, AND LOCAL PLUMBING CODES, N.F.P.A. REQUIREMENTS, AND PART 9.36 OF THE NATIONAL BUILDING CODE.
7. COORDINATE WORK WITH WORK OF OTHER TRADES TO AVOID CONFLICT.
8. ALTER THE LOCATION OF DUCTS OR PIPES AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR WITHOUT CHARGE TO THE CITY, PROVIDED THE CHANGE IS MADE BEFORE INSTALLATION AND DOES NOT NECESSITATE ADDITIONAL MATERIALS.
9. QUOTATIONS SHALL BE BASED ON THE USE OF SPECIFIED MANUFACTURERS OR APPROVED EQUAL. THE USE OF AN EQUAL OR ALTERNATE MANUFACTURER SHALL IN NO WAY RELIEVE THE MECHANICAL SUB CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING ALL WORK THAT MAY BE REQUIRED BY REASON OF DIFFERENT SPACE, WEIGHT, ELECTRICAL, OR OTHER REQUIREMENT FROM THAT OF THE SPECIFIED MANUFACTURER. ALTERNATES SHALL BE APPROVED PRIOR TO THE CLOSE OF BIDS. NO SUBMITTALS RECEIVED AFTER BID CLOSING WILL BE ACCEPTED.
10. THE MECHANICAL SUB CONTRACTOR SHALL SUBMIT ELECTRONIC COPIES OF SHOP DRAWINGS FOR ALL EQUIPMENT FOR REVIEW AND APPROVAL BY CONTRACT ADMINISTRATORS. CONTRACTOR SHALL STAMP SHOP DRAWINGS REVIEWED BY CONTRACTOR PRIOR TO SUBMISSION. CONTRACTOR SHALL LABEL SHOP DRAWINGS WITH THE CORRESPONDING EQUIPMENT LABEL LISTED ON MECHANICAL DRAWINGS, SPECIFICATION, AND/OR SCHEDULES. FAILURE TO COMPLY WILL RESULT IN SHOP DRAWINGS BEING RETURNED "UNREVIEWED" BY CONTRACT ADMINISTRATOR.
11. FURNISH TO THE CONTRACT ADMINISTRATOR THREE (3) HARD-COVERED LOOSE-LEAF BINDERS CONTAINING THEREIN ONE (1) COMPLETE SET OF MANUFACTURERS' OPERATING AND MAINTENANCE INSTRUCTIONS SHOWING ALL MAJOR ELEMENTS REQUIRING MAINTENANCE. INSTRUCTIONS SHALL BE COMPLETE FOR INSTALLATION, OPERATION AND MAINTENANCE AND SHALL INCLUDE PERTINENT INFORMATION SUCH AS DETAILED DRAWINGS AND OPERATION CURVES. SPARE PARTS, SUPPLIER LISTS AND ADDRESSES SHALL BE SUPPLIED. INSTRUCTION SHALL BE REQUIRED WITH THE CITY'S REPRESENTATIVE TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION.
12. ALL WIRING, SUPPLY AND INSTALLATION OF DISCONNECT SWITCHES FOR EQUIPMENT SPECIFIED HEREIN SHALL BE PERFORMED BY THE ELECTRICAL SUB CONTRACTOR, UNLESS OTHERWISE NOTED.
13. CONTRACTOR SHALL EXAMINE THE SITE AND CONDITIONS AFFECTING WORK, METHODS OF CONNECTION AND LOCATION OF ALL SERVICES INVOLVED UNDER THIS CONTRACT. FAILURE TO MAKE THIS VISIT IN NO WAY ALLEGATES THE MECHANICAL SUB CONTRACTOR FROM RESPONSIBILITY FOR COMPLETING THE MECHANICAL WORK OF THIS CONTRACT IN A WORKMANLIKE MANNER. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED THROUGH A FAILURE TO MAKE THIS EXAMINATION AND INVESTIGATION.
14. SCHEDULING OF ALL WORK SHALL BE ARRANGED WITH THE CITY, AND THE CITY SHALL BE NOTIFIED AND HIS APPROVAL OBTAINED PRIOR TO SHUTTING OFF EXISTING SERVICES FOR PURPOSES OF CONNECTING NEW WORK. WORK WITHIN THE BUILDING MAY HAVE TO BE PERFORMED DURING NON-REGULAR WORKING HOURS AND MUST CONFORM TO WORK RULES OF THE BUILDING AS DIRECTED BY THE CITY.
15. RECORD DRAWINGS:
 - 15.1. OBTAIN SETS OF WHITE PRINTS (ONE FOR EACH SYSTEM I.E. PLUMBING, HVAC, FIRE PROTECTION) AND KEEP AT JOB SITE AT ALL TIMES.
 - 15.2. RECORD ALL ADDITIONS OR DEVIATIONS FROM THE CONTRACT DOCUMENTS INCLUDING ALL CHANGES INCURRED BY ADDENDA, CHANGE ORDERS, FIELD CHANGES, JOB CONDITIONS, ETC.
 - 15.3. MECHANICAL SUB CONTRACTORS SHALL BE RESPONSIBLE FOR THE PRODUCTION OF RECORD RECORD DRAWINGS WHICH SHALL PROVIDE A COMPLETE AND ACCURATE RECORD OF THE ACTUAL MECHANICAL INSTALLATION. ALL PRINCIPLE BELOW GRADE OR INACCESSIBLE PIPING OR DUCT SYSTEMS, ETC. SHALL BE DIMENSIONED AT EACH CHANGE IN DIRECTION. INCLUDE ALL ROUTING OF SERVICES NOT INDICATED ON ORIGINAL DRAWINGS.
 - 15.4. PROJECT RECORD DRAWINGS SHALL BE TRANSFERRED BY MECHANICAL SUB CONTRACTOR TO REPRODUCIBLE BOND DRAWINGS AND LABELED RECORD.
 - 15.5. SUBMIT REPRODUCIBLE BOND DRAWINGS TO CONTRACT ADMINISTRATOR FOR REVIEW UPON COMPLETION IF CORRECTIVE MEASURES ARE REQUIRED AFTER THE SECOND CONTRACT ADMINISTRATOR REVIEW (DUE TO MISSING INFORMATION AND/OR IMPROPER DRAFTING STANDARDS), THE MECHANICAL SUB CONTRACTOR

- SHALL BE RESPONSIBLE FOR CONTRACT ADMINISTRATOR'S TIME COSTS FOR CORRECTIVE MEASURES, COURIER AND PRINTING COSTS.
- 15.6. CONTRACTOR SHALL EMPLOY CONTRACT ADMINISTRATOR (OR CAD DRAFTING SERVICE) TO PRODUCE ELECTRONIC COPY RECORD DRAWINGS. MECHANICAL SUB CONTRACTOR SHALL BEAR ALL COSTS OF PRODUCTION.
 - 15.7. COPY OF FINAL RECORD DRAWING SHALL BE SUBMITTED TO ARCHITECT.
 - 15.8. ALL COSTS OF RECORD DRAWINGS PRODUCTION SHALL BE BORNE BY MECHANICAL SUB CONTRACTOR.
16. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROVIDE TEMPORARY HEATING AND HOARDING AS REQUIRED FOR THE PROPER PROGRESS OF THE WORK.
 17. VERIFY SIZES, INVERTS AND LOCATIONS OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO SANITARY SEWER, STORM SEWER, DOMESTIC WATER MAINS, FORCE MAINS, ETC.
 18. HOISTING OF ALL MECHANICAL EQUIPMENT SHALL BE BY THE MECHANICAL SUB CONTRACTOR.
 19. ASSUME FULL RESPONSIBILITY FOR LAYING OUT ALL WORK AND ENSURING THAT NO DAMAGE IS CAUSED TO THE CITY'S EQUIPMENT AND PREMISES DUE TO IMPROPER LOCATION AND EXECUTION OF WORK IN THIS CONTRACT. PROTECT AND MAINTAIN ALL WORK UNTIL WORK HAS BEEN COMPLETED AND ACCEPTED BY THE CITY. STORE ALL MATERIALS AS REQUIRED, AND CLEAN UP REFUSE CAUSED BY ALL WORK.
 20. IDENTIFY ALL NEW PIPING WITHIN BUILDING INSTALLED IN THIS CONTRACT SHOWING SERVICE, PIPE SIZE, AND FLOW DIRECTION. USE CAPITAL LETTERS USING EITHER FIRE RESISTANT HIGH GLOSS INTERIOR ENAMEL PAINT OR WATERPROOF, HEAT RESISTANT PLASTIC MARKER TAPS (SIMILAR TO W.H. GRADY IDENTIFICATION TAPES, BANDS, MARKERS). IDENTIFY AT MAXIMUM OF EVERY 50 FT. AND AT LEAST ONCE IN EACH ROOM. LOCATE AND SIZE LETTERING SUCH THAT IT CAN BE SEEN FROM FLOOR.
 21. IN THE CASE OF DISCREPANCY BETWEEN ARCHITECTURAL AND MECHANICAL DRAWINGS TO NUMBER, TYPE, OR LOCATION OF HVAC EQUIPMENT AND SYSTEMS COMPONENTS, OBTAIN WRITTEN RULING.
 22. ALL TIME/DATE SENSITIVE ELECTRONIC EQUIPMENT AND SOFTWARE PROVIDED ON THIS PROJECT SHALL BE 4 DIGIT YEAR INPUT COMPATIBLE AND SHALL BE BASED ON THE USE OF FULL, UNABBREVIATED, UNAMBIGUOUS DISCRETE TIME AND DATE CODES.
 23. MECHANICAL SUB CONTRACTOR SHALL COORDINATE PROVISION OF POWER TO BUILDING CONTROL TRANSFORMERS WITH ELECTRICAL SUB CONTRACTOR AND CARRY ALL INCREMENTAL COSTS.
 24. COORDINATE THE ELECTRICAL REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH ELECTRICAL SUB CONTRACTOR. ELECTRICAL SUB CONTRACTOR SHALL PROVIDE THE FOLLOWING:
 - 24.1. ALL POWER WRING TO EQUIPMENT.
 - 24.2. ONE 15 AMP 120V/1PH/60HZ FUSED POWER SUPPLY TO EACH MECHANICAL EQUIPMENT AND/OR JANITOR ROOM.
 25. PROVIDE FIRE STOPPING AT ALL PIPING, CONDUIT (CONTROLS) AND DUCTWORK PENETRATIONS OF ALL REQUIRED FIRE SEPARATIONS WITH APPROVED MATERIAL SYSTEMS. ACCEPTABLE MATERIALS: 3M, DOW, CORNING, APS.
 26. MECHANICAL CONTRACT DOCUMENTS ARE DIAGRAMMATIC AND APPROXIMATE TO SCALE; REFER TO ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS, AND SITE VERIFY ALL CRITICAL DIMENSIONS. THE DRAWINGS AND SPECIFICATIONS ESTABLISH SCOPE FOR MATERIAL AND INSTALLATION QUALITY AND ARE NOT DETAILED INSTALLATION INSTRUCTIONS. ANY DISCREPANCIES MUST BE BROUGHT TO THE CONTRACT ADMINISTRATOR'S ATTENTION IN WRITING PRIOR TO THE CLOSE OF BIDS.
 27. SHOULD ANY DISCREPANCY APPEAR BETWEEN THE DRAWINGS AND SPECIFICATIONS, WHICH LEAVE THE CONTRACTOR IN DOUBT AS TO THE TRUE INTENT AND MEANING OF THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL OBTAIN A WRITTEN RULING FROM THE CONTRACT ADMINISTRATOR PRIOR TO BID SUBMISSION. IF WRITTEN APPROVAL IS NOT PROVIDED, THE MOST EXPENSIVE ALTERNATIVE SHALL BE INCLUDED IN THE BID PRICE.
 28. FIELD VERIFY ALL BUILDING AND SITE DIMENSIONS AND REVIEW MECHANICAL DRAWINGS AND SPECIFICATIONS PRIOR TO ANY FABRICATION OR INSTALLATION OF EQUIPMENT OR MATERIALS. DO NOT ATTEMPT ANY FABRICATION OR INSTALLATION UNTIL SUCH CLARIFICATION IS PROVIDED. NO CONTRACT REVISIONS WILL BE CONSIDERED FOR FAILURE TO VERIFY THESE DIMENSIONS ON SITE.
 29. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY EACH TO THE OTHER, WHAT IS CALLED FOR BY ONE SHALL BE BINDING AS IF CALLED FOR BY BOTH.
 30. MECHANICAL WORK SHALL BE COMPLETED IN CONFORMANCE WITH, AND SUBJECT TO, ALL CAUTIONARY NOTES AVAILABLE TO THE READER INCLUDING THOSE AVAILABLE ON THE WEBSITES OF THE MANUFACTURERS AND CONTRACT ADMINISTRATORS.

INSULATION

ALL INSULATING MATERIALS, METHODS, SIZES AND TYPES OF INSULATION FOR ALL PIPING AND DUCT WORK SHALL BE INSTALLED TO THE REQUIREMENTS OF THE ASHRAE STANDARDS 90.1-2010 "ENERGY STANDARD FOR BUILDING EXCEPT LOW-RISE RESIDENTIAL BUILDING", PART 9.36 OF THE NATIONAL BUILDING CODE AND THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) STANDARDS.

1. PROVIDE THICK RIGID PIPE INSULATION ON ALL DOMESTIC WATER PIPES C/W VAPOUR BARRIER.

PIPE SIZE	INSULATION THICKNESS
UP TO 2" (50MM)	1" (25 MM)
2" (50MM) AND GREATER	1½" (38 MM)
2. PROVIDE 1" (25 MM) THICK PIPE INSULATION ON ALL PLUMBING VENTS PASSING THROUGH ROOF FOR A DISTANCE OF 10'-0" (3 M) INSIDE FROM POINT OF COLD TO WARM SURFACE PENETRATION. INSULATION C/W VAPOUR BARRIER.
3. PROVIDE 1 1/2" (38 MM) THICK KNAUF ATMOSPHERE DUCTWRAP, 1.0 PCF DENSITY R4.5 (RSI 0.80) 25% COMPRESSED FLEXIBLE DUCT INSULATION C/W RFRFK FACING ON EXHAUST DUCTWORK & ALL SUPPLY DUCTWORK FROM ALL AIR HANDLING EQUIPMENT. EXHAUST DUCTWORK SHALL BE INSULATED FOR A MINIMUM DISTANCE OF 10'-0" (3 M) FROM PENETRATION OF BUILDING THERMAL ENVELOPE. REFER TO DRAWINGS FOR ADDITIONAL INSULATION REQUIREMENTS. ALL SUPPLY AIR DUCTWORK CONVEYING AIR-CONDITIONED AIR SHALL BE INSULATED.
4. PROVIDE 2" (50 MM) THICK KNAUF ATMOSPHERE DUCTWRAP, 1.5 PCF DENSITY, R6.4 (RSI 1.13) 25% COMPRESSED THERMAL FACED INSULATION ON ALL DUCTWORK CONVEYING OUTSIDE AIR COMPLETE WITH RFRFK FACING FACING. DUCTWORK SHALL BE INSULATED OVER ENTIRE RUN FROM PENETRATION OF BUILDING THERMAL ENVELOPE TO UNIT CONNECTION.
5. ACOUSTICALLY INSULATE DUCTWORK WITH 1" (25 MM) FLEXIBLE DUCT INSULATION WITH FLAME - ATTENUATED FIBRE BONDED WITH THERMOSECE RESIN. BLACK PLASTIC- COATED MAT FINISH. PROVIDE WHERE NOTED ON DRAWINGS OR AS SHOWN AS HATCHED DUCTWORK OR ALLOW FOR UP TO 10 FT. (3 M) FROM SUPPLY AND RETURN AIR OPENINGS OF ROOF MOUNTED EQUIPMENT. ACCEPTABLE PRODUCT: KNAUF AIR DUCT BOARD.
6. DO NOT EXTERNALLY INSULATE ANY DUCTWORK WHICH IS SPECIFIED OR SHOWN TO BE INTERNALLY INSULATED UNLESS NOTED OTHERWISE.
7. INSULATION COVERINGS:
 - 7.1. MASTIC FINISH OVER INSULATION SHALL BE VI-CRYL CP-10 WHITE WEATHER BARRIER COATING AS MANUFACTURED BY CHILDERS PRODUCTS COMPANY. IT SHALL BE APPLIED IN TWO COATS, THE FIRST COAT BEING A TACK COAT APPLIED AT A RATE OF TWO GALLONS PER 100 SQ. FT. (.81 L/SQ.M), AND WHILE STILL WET, A LAYER OF CHIL-GLAS #5 OPEN WEAVE GLASS CLOTH MEMBRANE SHALL BE EMBEDDED WITH ALL FABRIC COAT AT A COVERAGE OF FOUR GALLONS PER 100 SQ. FT. (1.6 L/SQ.M) SHALL BE APPLIED, FULLY COVERING THE CLOTH MEMBRANE, SO THAT THE MINIMUM DRY FILM THICKNESS IS 1/16" (0.63") (1.6 MM). THERE SHALL BE NO VOIDS OR HOLLOW AND THE MASTIC SHALL BE TOWELED,

SPRAYED OR WET-BRUSHED TO A SMOOTH EVEN FINISH. PROVIDE ALUMINUM JACKET THREE(3) SIDES. FINISH AS PER ARCHITECT BY GENERAL CONTRACTOR.

- 7.2. ALL ADJOINING UNINSULATED SURFACES MUST BE COMPLETELY WATER-PROOFED AND FLASHED EITHER BY EXTENDING THE VI-CRYL CP-10/11 WEATHER BARRIER COATING AND FABRIC MEMBRANE A MINIMUM OF 4" (102 MM) ONTO THE ADJOINING SURFACE, OR, IF THAT SURFACE WILL ATTAIN TEMPERATURES IN EXCESS OF 180 DEGREES F (82 DEGREES C), USE CHIL-JOINT CP-70 SEALANT AS THE FLASHING COMPOUND.
- 7.3. ALL INSULATION IN EXPOSED LOCATIONS, AND ALL DUCTWORK IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC., SHALL BE COVERED WITH CANVAS WRAP. INSULATION EXPOSED TO THE MOISTURE SHALL BE COMPLETE WITH COVER PER 9.1/9.2 ABOVE.
- 7.4. ALL DUCT INSULATION AND COVERINGS SHALL MEET THE REQUIREMENTS OF CAN/ULC-S110 "TEST FOR AIR DUCTS" AND HAVE A FLAME SPREAD RATING NOT EXCEEDING 25 AND A SMOKE DEVELOPED CLASSIFICATION NOT EXCEEDING 50. THIS SHALL INCLUDE ALL TAPES, SEALANTS, AND MISCELLANEOUS PRODUCTS ASSOCIATED WITH THE INSTALLATION.

OUTSIDE SERVICES

1. PROVIDE PIPING SYSTEMS INCLUDING ALL NECESSARY CONNECTIONS TO STREET MAINS FOR SANITARY SEWER, STORM SEWER, AND DOMESTIC/SPRINKLER WATER SERVICE.
2. RESPONSIBILITY FOR RESTORATION OF PAVED PUBLIC STREETS TO ORIGINAL CONDITION IF THEY HAVE BEEN AFFECTED AS A RESULT OF THE WORK IN THIS SECTION.
3. CONFIRMATION OF EXACT LOCATION AND INVERT ELEVATIONS OF SERVICES PRIOR TO COMMENCING WORK. IF ANY DISCREPANCIES SHOULD BE DISCOVERED, THEN NOTIFY THE CONTRACT ADMINISTRATOR IMMEDIATELY.
4. CONFORM WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATION, THE LOCAL AUTHORITIES HAVING JURISDICTION AND THE CITY OF WINNIPEG CONSTRUCTION SPECIFICATIONS. IN THE CASE OF CONFLICTING REQUIREMENTS, BE GOVERNED BY THE MOST SEVERE REGULATIONS.
5. SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH SPECIFICATIONS.
6. SECTION 15400 SHALL CONNECT TO SANITARY SEWER AND STORM SEWER 3'-0"(1.0M) OUTSIDE BUILDING.
7. PIPE FITTINGS AND JOINTS
 - 7.116. DOMESTIC WATER 2"(50MM) AND UNDER: TYPE "K" SOFT COPPER, THIRD PARTY CERTIFIED. CONNECT TO EXISTING SERVICE 3'-0"(1.0M) OUTSIDE BUILDING.
 - 7.117. FIRE SERVICE 6"(150MM) AND OVER: IPEX "BLUE BRUTE" AND SHALL CONFORM TO AWWA C900 "POLY (VINYL CHLORIDE)(PVC)PRESSURE PIPE FOR WATER", AND CERTIFIED TO CSA B137.2 "RIGID POLY (VINYL CHLORIDE)(PVC) PIPE FOR PRESSURE APPLICATIONS".
 - 7.118. SANITARY AND STORM SEWER PIPING 6" AND OVER IPEX CLASS PVC CLASS 150 TO AWWA C900 AND C905 AND CSA B137.0 AND B137.3. "RIGID POLYCHLORIDE (PVC)PIPING FOR PRESSURE APPLICATIONS".
8. EXAMINE AREA WHERE WORK IS TO BE PERFORMED FOR:
 - 8.1. ANYTHING THAT AFFECTS EXECUTION AND QUALITY OF WORK.
 - 8.2. PIPING CLEARANCES.
9. WHERE, UNDER THIS CONTRACT, IT IS NECESSARY TO CONNECT EXISTING WEAR MAINS TO THOSE WHICH ARE TO BE LAID, ALL PRECAUTIONARY MEASURES DEEMED NECESSARY BY THE CONTRACT ADMINISTRATOR TO PROTECT EXISTING MAINS, AND TO CAUSE THE LEAST INCONVENIENCE TO USERS OF EXISTING MAINS, SHALL BE CARRIED OUT BY THE OUTSIDE SERVICES CONTRACTOR AT NO ADDITIONAL CHARGE TO THE CITY. THIS CHARGE, IF ANY, TO BE INCLUDED. NO VALVE OR OTHER CONTROL ON THE SYSTEM SHALL BE OPERATED FOR ANY PURPOSE BY THE OUTSIDE SERVICES CONTRACTOR WITHOUT APPROVAL OF THE CONTRACT ADMINISTRATOR, AND ALL CONSUMERS AFFECTED BY SUCH OPERATIONS SHALL BE NOTIFIED BY THE OUTSIDE SERVICE CONTRACTOR, AT LEAST ONE HOUR BEFORE THE OPERATION AND ADVISED OF THE PROBABLE TIME WHEN SERVICE WILL BE RESTORED.
10. THE OUTSIDE SERVICE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES TO ANY UNDERGROUND OR SURFACE UTILITY STRUCTURES, DRAIN, SEWER, WATER SERVICE, VALVE, SERVICE BOX OR OTHER OBSTRUCTION ENCOUNTERED IN THE PROGRESS OF THE WORK. ANY SERVICE OR OTHER UTILITY DAMAGE, SHALL BE REPAIRED OR REPLACED AT THE OUTSIDE SERVICE CONTRACTOR'S EXPENSE TO THE ENTIRE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
11. PROCURE ALL PERMITS FOR CROSSING STREETS AND SIDEWALKS AND PERFORM NO EXCAVATION WITHOUT APPROVAL BY CITY ENGINEERING DEPARTMENT AND CONTRACT ADMINISTRATOR.
12. WHERE THE SURFACE OF A STREET, DRIVEWAY, BOULEVARD, OR SIDEWALK HAS BEEN CUT TO INSTALL PIPE, THE CROSSING SHALL BE BACKFILLED WITH GRANULAR FILL AND TAMPERED IN LIFTS AND RESURFACED TO THE ORIGINAL CONDITION, TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR AND AUTHORITIES HAVING JURISDICTION.
13. THIS CONTRACTOR SHALL MAKE APPLICATION AND PAY FOR ALL PERMITS, ASSESSMENTS, INSPECTION FEES, CONNECTION CHARGES, STREET CUT PERMITS AND ALL OTHER CHARGES PERTAINING TO THE COMPLETION OF INSTALLATION, TO ALL APPROPRIATE GOVERNMENTAL AUTHORITIES.
14. SEWER PIPES SHALL BE LAID ACCORDING TO THE GRADE AND ALIGNMENT SHOWN ON THE PLANS, WITHIN A TOLERANCE OF 1 1/2" (38 MM) VERTICAL AND 12" (300 MM) HORIZONTAL. THE OUTSIDE SERVICE CONTRACTOR TO ESTABLISH OWN BATTER BOARDS FOR LINE AND GRADE.
15. ALL PIPES SHALL BE LEFT UNCOVERED FOR INSPECTION AND NO PIPES SHALL BE COVERED UNTIL PERMISSION HAS BEEN GIVEN BY THE CONTRACT ADMINISTRATOR. THE CONTRACTOR SHALL ALLOW 48 HRS. NOTIFICATION PRIOR TO COMMENCEMENT OF WORK. SHOULD ANY PIPE BE COVERED BY THE CONTRACTOR BEFORE THE PERMISSION OF THE CONTRACT ADMINISTRATOR HAS BEEN OBTAINED, THE TRENCH SHALL BE REOPENED AT THE OUTSIDE CONTRACTOR'S EXPENSE.

PIPE BEDDING SHALL CONSIST OF A MINIMUM OF 4" (100 MM) SAND SHALL BE SPREAD AND GRADED OVER THE BOTTOM OF THE TRENCH BEFORE PLACING ANY PIPE. AFTER THE PIPE IS PLACED, FREE RUNNING SAND SHALL BE PLACED TO THE TOP OF THE PIPE AND THEN COMPACTED. PARTICULAR CARE SHALL BE TAKEN IN COMPACTING THIS MATERIAL TO GIVE PROPER SUPPORT TO THE PIPE. MORE SAND SHALL THEN BE PLACED AND THOROUGHLY COMPACTED TO 24" (600 MM) ABOVE THE PIPE IN 6" (150 MM) LIFTS. THE REMAINDER OF THE TRENCH WHERE GOING UNDER SIDEWALK PAVING, FLOOR SLABS, ETC. SHALL BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED IN 12" (300 MM) LIFTS TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR. WHERE THE TRENCHES RUN THROUGH GRASSSED AREAS, OR NON-PAVED AREAS, THE REMAINDER OF THE TRENCH MAY THEN BE BACKFILLED WITH CLEAN EARTH MECHANICALLY COMPACTED IN 12" (300 MM) LIFTS. ALL EXCAVATION SHALL BE CARRIED OUT IN STRICT ACCORDANCE WITH ALL GOVERNING CODES AND PROVINCIAL DEPARTMENT OF LABOUR REGULATIONS. ALL EXCESS MATERIAL SHALL BE REMOVED FROM THE SITE OR BE PLACED AS DIRECTED BY THE ARCHITECT AFTER INSTALLATION OF THE BURIED SERVICE.

PLUMBING

1. PROVIDE COMPLETE FUNCTIONAL PLUMBING SYSTEM COMPRISED OF DOMESTIC WATER PIPING, VENTS, SANITARY AND DRAINAGE PIPING, ETC.
2. PLUMBING SIZING SHOWN ON DRAWINGS IS BASED ON COPPER PIPING FOR DOMESTIC WATER, AND CAST IRON PIPING FOR SANITARY AND STORM. MECHANICAL SUB CONTRACTOR IS RESPONSIBLE FOR RESIZING PLUMBING AS REQUIRED WHEN USING ALTERNATE MATERIALS.
3. ACCEPTABLE MATERIALS SHALL BE USED AS DESCRIBED BELOW.
 - 3.1. DRAINAGE WASTE AND VENT (DWV) MATERIALS
 - 3.1.1. UNDERGROUND PIPING
 - 3.1.1.1. PVC MEETING CSA B181.2
 - 3.1.1.2. CAST IRON MEETING CSA B70
 - 3.1.1.1.1. HUB AND SPIGOT CONNECTIONS, THRUST BLOCKS AT CHANGES IN DIRECTION.
 - 3.1.2. FOR ABOVEGROUND DWV APPLICATIONS (COMBUSTIBLE CONSTRUCTION)
 - 3.1.1.1. ABS MEETING CSA B181.1
 - 3.1.1.2. PVC MEETING CSA B181.2
 - 3.1.2. FOR ABOVEGROUND DWV APPLICATIONS (NON-COMBUSTIBLE CONSTRUCTION)
 - 3.1.1.1. ALL PIPING TO HAVE A FLAME SPREAD RATING OF LESS THAN 25.
 - 3.1.1.2. PVC MEETING CSA B151.2, CAN/ULC S102.2

- 3.1.2. FOR DWV APPLICATIONS IN AIR PLENUMS
 - 3.1.1.1. ALL PIPING TO HAVE A FLAME SPREAD RATING OF LESS THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF LESS THAN 50.
 - 3.1.1.2. PVC MEETING CSA B151.2, CAN/ULC S102.2
- 3.2. DOMESTIC WATER PIPING MATERIALS
 - 3.2.1. ALL PRODUCTS SHALL BE UL CLASSIFIED IN ACCORDANCE WITH ANSI/NSF-61 FOR POTABLE WATER SERVICE, AND SHALL BE CERTIFIED TO THE LOW LEAD REQUIREMENTS OF NSF-372.
 - 3.2.2. PEX
 - 3.2.2.1. ALL PIPE SHALL BE UPONOR HIGH-DENSITY CROSS-LINKED POLYETHYLENE MANUFACTURED USING THE HIGH-PRESSURE PEROXIDE METHOD OF CROSS-LINKING (PEX A). PIPE SHALL CONFORM TO ASTM F877, CSA B137.5 AND NSF/ANSI 61.
 - 3.2.2.2. PIPE SHALL BE RATED FOR CONTINUOUS OPERATION OF 100 PSI GAUGE PRESSURE AT 180F TEMPERATURE (630 KPA @ 82°C) AND 80 PSI GAUGE PRESSURE AT 200F TEMPERATURE (550 KPA 93°C)
 - 3.2.2.3. PEX PIPE IN EXPOSED LOCATIONS SHALL BE RIGID (NOT COIL).
 - 3.2.2.4. PIPE SHALL BE RESISTANT TO HOT CHLORINATED WATER. PIPE TO HAVE A MINIMUM EXTRAPOLATED TIME-TO-FAILURE OF 50 YEARS.
 - 3.2.2.5. PEX PIPE TO HAVE A CO-EXTRUDED COLORED UV SHIELD MADE FROM UV-RESISTANT POLYETHYLENE PROVIDING UV RESISTANCE.
 - 3.2.2.6. PIPE TO HAVE A FLAME SPREAD INDEX OF LESS THEN 25 AND A SMOKE DEVELOPED INDEX OF LESS THAN 50 WHEN TESTED IN ACCORDANCE WITH CAN/ULC S102.2. IN ANY CASE WHERE THE PIPE DOES NOT CONFORM WITH THESE STANDARDS, APPROPRIATE PIPING INSULATION SHALL BE INSTALLED IN ORDER TO MEET THE STANDARD.

4. DRAINS AND VENT PIPING UNDERGROUND INSIDE BUILDING SHALL BE CAST IRON CLASS 4000, OR PVC PLASTIC. FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON OR SOLVENT CEMENT FOR PVC.
5. SANITARY WASTE STACKS, HORIZONTAL WASTE, VENT, ABOVE GROUND INSIDE BUILDING, SHALL BE CAST IRON CLASS 4000. VENT PIPING AND FIXTURE RUN-OUTS MAY ALSO BE DWV COPPER OR PVC PLASTIC. FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON, SOLDER FOR DWV COPPER AND SOLVENT CEMENT FOR PVC.
6. ALL PVC PLASTIC PIPING USED SHALL HAVE A FLAME SPREAD RATING OF 25, AND A SMOKE DEVELOPED RATING OF 50. PIPING AND FITTINGS SHALL BE OF ONE MANUFACTURE; STANDARD OF ACCEPTANCE: IPEX XFR.
7. MECHANICAL SUB CONTRACTOR SHALL VERIFY ON SITE ALL CONNECTION POINTS TO EXISTING BUILDING SERVICES. COORDINATE ALL NEW PIPING RUNS WITH CONTRACT ADMINISTRATOR OR CITY'S REPRESENTATIVE.
8. SOLDERED FITTINGS IN POTABLE WATER SYSTEMS
 - 8.1. PROVIDE LEAD, ANTIMONY, CADMIUM AND ZINC FREE SOLDERS COMPOSED OF TIN, COPPER, SILVER OR NICKEL COMPONENTS THAT ARE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.
9. VALVES
 - 9.1. SHALL BE BY ONE MANUFACTURER. STANDARD OF ACCEPTANCE: APOLLO VALVES.
 - 9.2. SHALL BE UL CLASSIFIED IN ACCORDANCE WITH ANSI/NSF-61 FOR POTABLE WATER SERVICE, AND SHALL BE CERTIFIED TO THE LOW LEAD REQUIREMENTS OF NSF-372.
10. MANUFACTURED SHOCK ABSORBERS, AUTOMATIC AIR VENTS, AND PARTITION STOPS SHALL BE INSTALLED AT THE TOP OF ALL RISERS, AND ON ALL FIXTURES OR BATTERY OF FIXTURES.
11. MECHANICAL SUB CONTRACTOR SHALL ALLOW FOR IN BID QUOTATION ANY ADDITIONAL LABOUR, MATERIALS, ETC. DEEMED NECESSARY DUE TO EXACT SITE CONDITIONS WHICH HAVE NOT BEEN REFLECTED IN MECHANICAL DRAWING OR IN MECHANICAL SPECIFICATION. NOTIFY CONTRACT ADMINISTRATOR OF ALL DISCREPANCIES PRIOR TO BID CLOSE.
12. ON COMPLETION, ALL PIPING SYSTEMS SHALL BE CLEANED & FLUSHED OUT TO REMOVE ANY FOREIGN MATERIAL IN THE PIPING.
13. CONTRACTOR SHALL COORDINATE SERVICE INSTALLATIONS AND/OR MODIFICATIONS WITH LOCAL UTILITY PRIOR TO COMMENCEMENT OF WORK. PAY ALL COSTS AND/OR FEES.
14. PROVIDE DIELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.
15. USE THE FOLLOWING ROD DIAMETER AND SPAACING SCHEDULE TO ESTABLISH MINIMUM HANGING STANDARDS FOR HORIZONTAL PIPING:

PIPE SIZE	ROD DIA	STEEL	COPPER
UP TO 3/4"	3/8"	6	6'
1" TO 1 1/4"	3/8"	8	6'
1 1/2" & 2"	3/8"	10'	8'
2 1/2" & 3"	1/2"	12'	8'
4" & 5"	5/8"	12'	8'
6"	3/4"	12'	

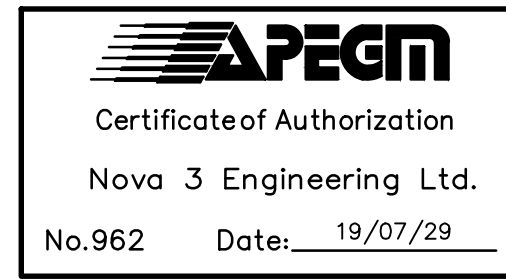
16. PIPE HANGERS WHERE REQUIRED SHALL BE GRINNEL FIG.65 FOR STEEL PIPE AND FIG.117 EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE OR ATTACHED TO FIG.225 OR 227 CLAMP ATTACHED TO FLOOR JOIST AND ROOF JOIST. FOR INSULATED PIPING, PROVIDE PROTECTION FIG.167 SADDLES SIZE HANGER TO ACCOMMODATE INSULATION WHERE APPLIED.
17. THE NEW BUILDING DOMESTIC WATER SERVICES ARE TO BE PROTECTED BY A BACKFLOW PREVENTION SYSTEM AS PER CSA B64.10. BASED ON THE BUILDING OCCUPANCY, THE BUILDING SHALL BE PROVIDED WITH A REDUCED PRESSURE BACKFLOW PREVENTER/ DOUBLE CHECK VALVE BACKFLOW PREVENTER. CONFIRM EXACT REQUIREMENTS WITH LOCAL AUTHORITY.
 - 17.1. PLUMBING FIXTURES ARE TO BE PROVIDED WITH BACKFLOW PREVENTION BASED ON THE FIXTURE HAZARD TYPE DEFINED IN CSA B64. BACKFLOW PREVENTION SHALL BE A VACUUM BREAKER (HCVB) FOR MINOR HAZARD, DOUBLE CHECK VALVE BACKFLOW PREVENTER (DCVA) FOR MEDIUM HAZARD OR REDUCED PRESSURE BACKFLOW PREVENTER (RP) FOR HIGH HAZARD FIXTURES.
 - 17.2. PROVIDE BACKFLOW PREVENTION FOR THE FLOWING FIXTURES (OR GROUP OF FIXTURES) AS DEFINED ABOVE.

17.2.1. BASIN	DCVA
17.2.2. SINK TANK	DCVA
17.2.3. FLUSHING EQUIPMENT DEVICE	RP
17.2.4. HOSE CONNECTION (NON-RESIDENTIAL)	DCVA/RP
17.2.5. HOT WATER SYSTEMS CONNECTION	HCVB
17.2.6. LAVATORY	DCVA
17.2.7. TRAP PRIMER	RP

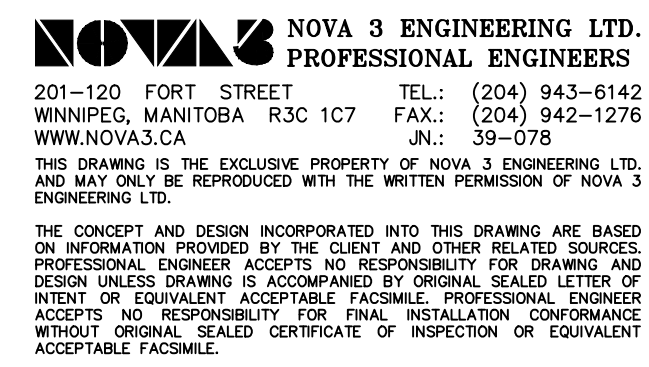
PLUMBING FIXTURES AND EQUIPMENT.

- WC-1 FLOOR MOUNTED TOILET - SS - TANK TYPE
- WHITEHALL BEST-CARE #WH2145_10 TOILET, HIGH, 16 GA. (1.5 MM) TYPE 304 STAINLESS STEEL SEAMLESS WELD CONSTRUCTION, ELONGATED BOWL, POWDER COATED WHITE ON EXPOSED SURFACE FINISH, FLOOR MOUNTED, SIPHON JET FLUSH ACTION, SIPHON JET FLUSH ACTION, ELONGATED BOWL, ANTI-LIGATURE FLUSH VALVE COVER WITH 1.6 GPF (6.0 LPT) FLUSH VALVE (WHITE), 2-1/8" (54 MM) BALL PASS AND FULLY ENCLOSED P-TRAP, FLOOR OUTLET (10" ROUGH-IN), INTEGRAL SEAT, 38 MM (1-1/2") NPT FLUSHING INLET CONNECTION, FINISHED WITH SIX REMOVABLE WALL BRACKETS SECURED WITH HAND RESISTANT SCREWS, TOP SUPPLY, GASKETED WASTE OUTLET, ASME A112.19.3-2008 AND CSA B45.4-2008 COMPLIANT. MCQUIRE #LFBV2-02 LAVATORY SUPPLY, LEAD FREE CHROME PLATED POLISHED BRASS, 10 MM (3/8") I.D. INLET X 165 MM (6-1/2") HORIZONTAL EXTENSION TUBES, LOOSE KEY HANDLE, ESCUTCHION. PROVIDE FLOOR FLANGE, (SAME MATERIAL AS THE CONNECTING PIPE DRAIN), WITH ALL BRASS BOLTS AND WITH RUBBER GASKET.
- L-1 WALL HUNG BASIN - SINGLE HANDLE FAUCET - BELOW DECK MECHANICAL WATER MIXING VALVE
- FRANKE COMMERCIAL WT SERIES #WT400C-8 BASIN, CUSTOM, 400 MM X 452 MM X 150 MM (15-3/4" X 17-13/16" X 5-1/2") HIGH, GRADE 18-10 18 GA. (1.2 MM) TYPE 304 STAINLESS STEEL, BRUSHED FINISH EXPOSED SURFACE, FOR CARRIER WITH STEEL PLATE, REAR OVERFLOW, FAUCET LEDGE. MUST SPECIFY HOLE

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ISSUED FOR CONSTRUCTION

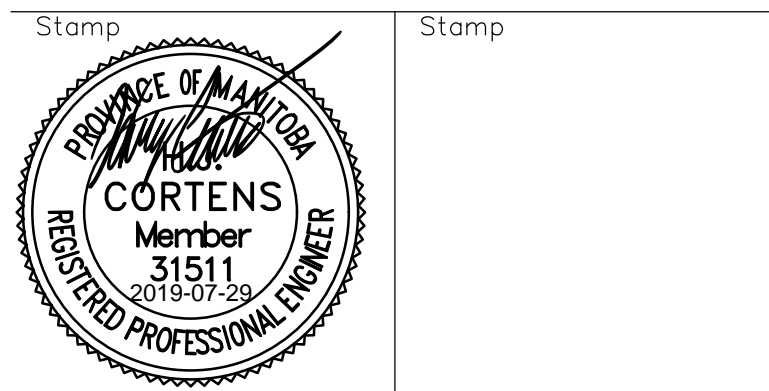


Revisions

Date	Revision
19/07/29	Issued for Tender, Permit, and Construction

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Project City of Winnipeg
Little Mountain Park
Washroom/Change Building
64093 Klimpke Road
Winnipeg, Manitoba

drawing title	MECHANICAL SPECIFICATION		
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reference no.	sheet	M4.0	REV.