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Part 1 GENERAL 1.1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES AND LAWS OF THE LOCAL, PROVINCIAL, AND FEDERAL GOVERNMENTS AND ALL OTHER AUTHORITIES HAVING JURISDICTION OVER THE SITE. THIS INCLUDES BUT IS NOT LIMITED TO LATEST EDITIONS AND STANDARDS OF: 1.1.1. THE CANADIAN ELECTRICAL CODE; 1.1.2. THE NATIONAL BUILDING CODE; 1.1.3. ALL PROVINCIAL CODES AND BULLETINS; 1.1.4. ALL PERTINENT CANADIAN STANDARDS ASSOCIATION (CSA) STANDARDS; 1.1.5. ALL PERTINENT UNDERWRITERS' LABORATORIES OF CANADA (ULC) STANDARDS; 1.1.6. CANADA OCCUPATIONAL SAFETY AND HEALTH REGULATIONS; 1.1.7. THE CANADA LABOR CODE; 1.1.8. CANADA NATIONAL ENERGY CODE OF CANADA; 1.1.9. ILLUMINATION ENGINEERING SOCIETY (IES) STANDARDS; 1.1.10. AMERICAN NATIONAL STANDARD INSTITUTE (ANSI); 1.1.11. ELECTRICAL AND ELECTRONIC MANUFACTURERS ASSOCIATION OF CANADA (EEMAC); 1.1.12. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE). 1.2. WHEN REQUIREMENTS DESCRIBED WITHIN THE CONTRACT DOCUMENT DRAWINGS AND SPECIFICATIONS CONFLICT WITH CODE REQUIREMENTS, THE CODE REQUIREMENTS SHALL TAKE PRECEDENT. 1.3. PROVIDE A COMPLETE, FULLY FUNCTIONAL, AND CODE COMPLIANT INSTALLATION AS INDICATED ON THE CONTRACT DOCUMENTS TO OPERATIONAL SATISFACTION OF THE CITY AND ENGINEER. ALL SUPPLEMENTARY MISCELLANEOUS ITEMS, DEVICES, MATERIALS NOT SPECIFICALLY SHOWN BUT NECESSARY FOR A SECURE AND COMPLETE ELECTRICAL INSTALLATION SHALL BE PROVIDED. 1.4. PROVIDE ALL REQUIRED PERMITS AND LICENSES. PAY ALL FEES AND OBTAIN ALL REQUIRED APPROVALS FROM APPROPRIATE AUTHORITIES HAVING JURISDICTION. PROVIDE ENGINEER WITH BOTH A COPY OF THE PERMIT AND THE CERTIFICATE OF ACCEPTANCE FROM ALL AUTHORITIES HAVING JURISDICTION. 1.5. PROVIDE A WARRANTY OF MINIMUM ONE (1) CALENDAR YEAR AFTER THE ACCEPTANCE OF INSTALLATION. ALL EQUIPMENT SHALL BE TESTED IN PRESENCE OF THE CITY PRIOR TO FINAL ACCEPTANCE. 1.6. ELECTRICAL CONTRACTOR, MECHANICAL CONTRACTOR AND ALL OTHER SUCCESSFUL TRADES SHALL COORDINATE LOCATIONS AND REQUIREMENTS OF EVERY DISCIPLINE'S SCOPE. 1.7. ELECTRICAL AND MECHANICAL CONTRACTOR SHALL MUTUALLY COORDINATE NECESSARY CONNECTIONS TO ENERGIZE ALL ITEMS OF EQUIPMENT PRIOR TO ORDERING. THIS INCLUDES FINAL ELECTRICAL NAMEPLATE INFORMATION, VOLTAGES, STARTER REQUIREMENTS, DETAILED CONTROL INFORMATION, AND ANY INFORMATION REQUIRED FOR THE PROPER INTENDED OPERATION OF THE ELECTRICAL AND MECHANICAL INSTALLATIONS. 1.8. ELECTRICAL CONTRACTOR IS RESPONSIBLE TO REVIEW THE COMPLETE SET OF CONTRACT DOCUMENTS AND TO VISIT PROJECT SITE TO DETERMINE EXISTING CONDITIONS AND ENSURE ALL WORK CAN BE CARRIED OUT AS SPECIFIED WITHIN THIS CONTRACT. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED UPON FAILURE TO MAKE THIS EXAMINATION. REPORT TO THE ENGINEER ANY OMISSION, INTERFERENCE OR DISCREPANCY PRIOR TO TENDER CLOSE. 1.9. ELECTRICAL CONTRACTOR SHALL TAKE FULL RESPONSIBILITY FOR ANY DAMAGES OR COSTS INCURRED BY THE CITY OR THEIR REPRESENTATIVES BY IMPROPER EXECUTION OF THIS CONTRACT. 1.10. EQUIPMENT, DEVICES AND MATERIALS SHALL BE PROVIDED AS SPECIFIED ON THE DRAWINGS. EQUAL REQUESTS SHALL BE CONSIDERED NO LATER THAN TEN (10) WORKING DAYS PRIOR TO TENDER CLOSE. 1.11. ELECTRICAL CONTRACTOR MAY SUBMIT SHOP DRAWINGS TO THE ENGINEER PRIOR TO ORDERING MATERIALS OR EQUIPMENT FOR REVIEW OF GENERAL CONFORMANCE. 1.12. ENSURE ALL BARRIER FREE REQUIREMENTS ARE ACHIEVED AS PER THE LATEST EDITION OF THE NATIONAL BUILDING CODE OF CANADA, ARCHITECTURAL DRAWINGS AND LOCAL BY-LAWS. 1.13. UPON PROJECT COMPLETION PROVIDE TO THE CONTRACT ADMINISTRATOR FOR REVIEW: 1.13.1. MARKED-UP RECORD (AS-BUILT) DRAWINGS PRINTS OR PDF; 1.13.2. HARD COVER MANUALS ENTITLED "ELECTRICAL OPERATING AND MAINTENANCE MANUAL" CONTAINING THE FOLLOWING: 1.13.2.1. WARRANTY LETTER; 1.13.2.2. PERMIT; 1.13.2.3. CERTIFICATION REPORTS; 1.13.2.4. DESCRIPTION OF ALL SYSTEMS AND EQUIPMENT; 1.13.2.5. A COMPLETE SET OF MANUFACTURER'S OPERATING AND MAINTENANCE INSTRUCTIONS; 1.13.2.6. TEST DATA, INCLUDING FIRE ALARM VERIFICATION INSPECTION REPORT IF APPLICABLE. ALL SECTIONS SHALL BE INDEXED. ALL OF THE ABOVE DOCUMENTS SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR FOR APPROVAL PRIOR TO BEING TURNED OVER TO THE CITY. 2. GROUNDING AND BONDING 2.1. PROVIDE GROUNDING IN ACCORDANCE WITH LATEST EDITION OF THE CANADIAN ELECTRICAL CODE, AND THE RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES OF ALL AUTHORITIES HAVING JURISDICTION OVER THE SITE. GROUND EQUIPMENT TO CSA C22.2 No. 41. COPPER GROUNDING CONDUCTORS TO CSA G7.1. ALL COMPONENTS SHALL BE SECURELY AND ADEQUATELY GROUNDED. PROVIDE GROUNDING JUMPERS, GROUNDING STUDS, AND BUSHINGS AS REQUIRED. 2.2. ALL BONDING CONDUCTORS SHALL BE SIZED IN ACCORDANCE WITH C.E.C. 10-814. 3. ELECTRICAL SITE SERVICES 3.1. COORDINATE COMPLETE ELECTRICAL POWER SERVICE INSTALLATION WITH THE LOCAL POWER UTILITY. CONFIRM FINAL LOCATIONS AND AVAILABILITY OF ALL SERVICE POINTS TO ACCOMMODATE UTILITY POWER. CONFIRM LOAD INCREASE WITH LOCAL UTILITY. 4. WIRING METHODS AND DEVICE INSTALLATION 4.1. ALL EXPOSED AND CONCEALED WIRING SHALL BE IN CONDUIT. BX ARMORED CABLE MAY BE USED IN STUD PARTITION WALL APPLICATIONS NOT EXCEEDING 30' (9.144m) IN LENGTH. BX ARMORED CABLE MAY BE USED FOR RECESSED LUMINAIRE DROPS NOT EXCEEDING 30' (9.144m) IN LENGTH. 4.2. ALL CONDUIT SHALL BE ELECTRIC METALLIC TUBING (EMT) OR RIGID PVC UNLESS OTHERWISE INDICATED OR REQUIRED BY APPLICABLE CODES. CONDUIT IN HUMID OR CORROSIVE AREAS SHALL BE RIGID PVC. UTILIZE STEEL FITTINGS. DRAWINGS DO NOT SHOW SPECIFIC CONDUIT RUNS. ALL CONDUIT SHALL BE CONCEALED UNLESS OTHERWISE INDICATED IN SPECIFICATIONS AND/OR SHOWN ON DRAWINGS. ALL DEVICES SHALL BE SURFACE MOUNTED EXCEPT AS SHOWN. 4.3. UTILIZE RIGID GALVANIZED STEEL FOR ALL EXPOSED OUTDOOR, UNDERGROUND INSTALLATIONS OR AS REQUIRED BY AUTHORITY HAVING JURISDICTION. 4.4. ALL CONDUITS SHALL BE CONCEALED WHEREVER POSSIBLE. OBTAIN APPROVAL OF ALL EXPOSED CONDUITS FROM CITY AND ENGINEER PRIOR TO INSTALLATION.			
0	ISSUED FOR CONSTRUCTION	2026-07-16	D.S.
Rev	Revision Description	Date	Issued by
Revision Schedule			

4.5. ALL CONDUITS SHALL BE MOUNTED PARALLEL TO STRUCTURAL LINES WITH CONCENTRIC BENDS. ALL CONDUITS SHALL BE SIZED TO LATEST EDITION OF THE CANADIAN ELECTRICAL CODE. ALL EMPTY CONDUITS SHALL BE PROPERLY PLUGGED TO PREVENT ENTRANCE OF DIRT AND MOISTURE.	4.6. FLEXIBLE CONDUITS DIRECTLY FROM JUNCTION BOXES MAY BE USED TO CONNECT MECHANICAL MOTORS, CONTROL STARTERS AND EQUIPMENT. FLEXIBLE CONDUITS SHALL BE PLASTIC JACKETED AND SEAL TIGHT.	4.7. WHERE CONDUITS ARE INSTALLED IN CONCRETE SLABS AND CROSS STRUCTURAL EXPANSION JOINTS, EXPANSION FITTINGS COMPLETE WITH BONDING JUMPERS AND CLAMPS SHALL NEED TO BE PROVIDED.	4.8. ALL WIRING SHALL BE COPPER, 600V (90 DEGREE CELSIUS), RW90 X-LINK POLYETHYLENE UNLESS OTHERWISE INDICATED. MINIMUM WIRE SIZE IS #12 AWG UNLESS FOR USE WITH LOW VOLTAGE CONTROL WIRING OR UNLESS SPECIFICALLY SPECIFIED.	4.9. ALUMINUM FEEDERS ARE NOT PERMITTED UNLESS INDICATED ON DRAWINGS OR APPROVAL IS OBTAINED IN WRITING FROM BOTH THE CITY AND THE ENGINEER.	4.10. DEVICES AND JUNCTION BOXES SHALL BE HOT DIP GALVANIZED. SIZE AND TYPE TO SUITE APPLICATION. ALL BOXES SHALL BE FLUSH MOUNTED. GANG BOXES WHERE WIRING DEVICES ARE GROUPED.	4.10.1. PROVIDE BLANK COVER PLATES FOR ALL BOXES WITHOUT WIRING DEVICES. ALL OUTLET BOXES SHALL BE SUPPLIED WITH GROUND STUD.	4.10.2. INSTALL BOXES TO CLEAR ALL BUILDING AND MECHANICAL SERVICES EQUIPMENT. WHERE TWO OR MORE DEVICES ARE SHOWN AT ONE LOCATION, UTILIZE MULTI GANG BOXES. SUPPLY WALL OUTLET BOXES WITH COVERS.	4.10.3. PROVIDE JUNCTION BOXES WITH 20% SPARE TERMINAL BLOCKS. SUPPORT SURFACE MOUNTED BOXES INDEPENDENTLY OF CONDUITS ENTERING BOXES.	4.10.4. SECURELY FASTEN FLUSH MOUNTED BOXES TO SUPPORTING STUDS OR WALL STRUCTURE AND SUPPORT INDEPENDENTLY OF THE CONDUIT OR CABLES ENTERING THE BOX.	4.10.5. INSTALL JUNCTION AND PULL BOXES MOUNTED ON BRICK, CONCRETE OR BLOCK WALLS WITH 3mm(1/8 INCH) THICK LEAD OR NYLON WASHER BETWEEN BOX AND WALL FACE.	4.10.6. PROVIDE PULL BOXES SIZED TO ELECTRICAL CODE REQUIREMENTS, IN ALL CONDUIT RACEWAY SYSTEMS TO LIMIT LENGTH OF STRAIGHT CONDUIT RUNS TO 30m (100 ft). REDUCE THIS LENGTH BY 7.5m (25 ft) FOR EACH 90 DEGREE BEND OR 4m (12ft) FOR EACH 45 DEGREE BEND OR OFFSET.	4.10.7. MARK LOCATION AND SIZE OF ALL PULL BOXES ON RECORD DRAWINGS.	4.11. ALL RECEPTACLES SHAL BE SPECIFICATION GRADE, WHITE, 15A, 120V AC HEAVY DUTY SPECIFICATION GRADE TO CSA C22.2 No.42-10 GENERAL USE RECEPTACLES. RECEPTACLES SHALL HAVE HEAVY DUTY NYLON FACE WITH STEEL REINFORING PLATE IN CENTER. RECEPTACLE SHALL HAVE SPRING LOADED BACK WIRING. RECEPTACLE CONTACTS SHALL HAVE SPRING STEEL CLIPS TO REDUCE CONTACT FATIGUE. RECEPTACLES SHALL BE SUITABLE FOR #10 AWG BACK AND SIDE WIRING. RECEPTACLES SHALL BE MOUNTED AT 450mm A.F.F. UNLESS OTHERWISE INDICATED. RECEPTACLES MOUNTED ABOVE COUNTER SHALL BE 150mm ABOVE SURFACE AREA. CONFIRM EXACT MOUNTING LOCATIONS AND HEIGHTS WITH ARCHITECTURAL ELEVATIONS. PROVIDE LAMACOID LABELS WITH AMPERAGE, VOLTAGE, AND PHASE FOR ALL RECEPTACLES OTHER THAN STANDARD 15A, 120V AC.	4.12. ALL WALL MOUNTED SWITCHES, DIMMERS, AND OCCUPANCY SENSORS SHALL BE SPECIFICATION GRADE, WHITE, 15A, 120V AC AND SHALL BE MOUNTED AT 1200mm A.F.F. UNLESS OTHERWISE INDICATED.	4.13. COVER PLATES FOR ALL FLUSH MOUNTED DEVICES SHALL BE BRUSHED STAINLESS STEEL. COVER PLATES FROM ONE MANUFACTURER SHALL BE USED THROUGHOUT PROJECT TO MATCH SWITCHES AND RECEPTACLES. FOR WIRING DEVICES MOUNTED IN FLUSH MOUNTED OUTLET BOXES, THICKNESS SHALL BE 2.5mm.	4.14. RELOCATE ALL OUTLETS REQUESTED BY CITY OR ENGINEER PRIOR TO ROUGH-IN. RELOCATE OUTLETS AT NO ADDITIONAL COST TO THE CITY IF REQUESTED BY THE AUTHORITY HAVING JURISDICTION.	4.15. SUPPLY, INSTALL, WIRE AND CONNECT ALL ELECTRIC HEATERS AS INDICATED. REFER TO MECHANICAL SCHEDULE AND MECHANICAL CONTRACT DOCUMENTS FOR DETAILS. COORDINATE WITH MECHANICAL AND CONTRACTORS ON SITE.	4.16. PROVIDE A FINAL CONNECTION FOR ALL MECHANICAL AND THE CITY'S EQUIPMENT AS DESCRIBED IN THE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS AND FINAL EQUIPMENT NAMEPLATE. PROVIDE MATCHING RECEPTACLE AS REQUIRED.	4.17. PROVIDE ALL MECHANICAL MOTOR CONTROL CONNECTIONS AS REQUIRED. REFER TO MECHANICAL SCHEDULE AND MECHANICAL CONTRACT DOCUMENTS FOR DETAILS. COORDINATE WITH MECHANICAL AND CONTRACTORS ON SITE.	4.18. ALL DISCONNECT SWITCHES SHALL BE SEPARATE FROM EQUIPMENT. INTEGRAL DISCONNECT SWITCHES SHALL BE NOT PERMISSIBLE.	4.19. PROVIDE UNFUSED DISCONNECT SWITCHES, VOLTAGE AND AMPERAGE RATED TO SUIT LOADS. MAKE PROVISION FOR PADLOCKING IN THE "OFF" POSITION. MECHANICAL INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IS IN "ON" POSITION. "ON/OFF" SWITCH POSITION INDICATION ON SWITCH ENCLOSURE COVER. DISCONNECT SHALL BE FRONT- OPERATIONAL, HEAVY DUTY, INDUSTRIAL GRADE, QUICK-MAKE, QUICK-BREAK TYPE AND SHALL BE 100% LOAD-MAKE. LOAD BREAK RATED. DISCONNECTS SHALL EACH HAVE EARLY BREAKER, NORMALLY OPEN VOLTAGE FREE AUXILIARY CONTACT. DISCONNECTS FOR ALL EQUIPMENT SPECIFIED SHALL BE AS MANUFACTURED BY CUTLER-HAMMER HD SERIES, SCHNEIDER CANADA SQUARE "D" CH SERIES.	4.20. ALL FEEDS WITHIN RETURN AIR PLENUMS SHALL BE RATED FOR THAT PURPOSE. AC90 AND WIRE IN CONDUIT. ACWU IS NOT ACCEPTABLE.	4.21. ELECTRICAL CONTRACTOR SHALL FILL ALL VOIDS BETWEEN ELECTRICAL SERVICES AND OPENINGS THROUGH FIRE RATED WALLS AND FLOORS USING AN APPROVED UL/ULC LISTED FIRE STOP SYSTEM WITH A RATING NOT LESS THAN THE FIRE RESISTANCE RATING REQUIRED FOR THE FIRE SEPARATION.	4.22. STRUT CHANNEL, FITTINGS, FASTENINGS AND ACCESSORIES	4.22.1. STRUT CHANNEL AND ASSOCIATED ACCESSORIES SHALL BE RATED FOR THE ENVIRONMENT IN WHICH THEY ARE INSTALLED.	4.22.2. STRUT CLAMPS SHALL BE ONE PIECE HEAVY-DUTY CONSTRUCTION WITH PARALLEL HOOK DESIGN.	4.22.3. FASTENINGS AND SUPPORTS (INCLUDING CHANNELS) AND THEIR ASSOCIATED HARDWARE SHALL BE MADE OF THE SAME MATERIALS TO REDUCE CORROSION POTENTIAL.	4.22.4. TWO HOLE PVC STRAPS SHALL SECURE SURFACE CONDUITS. FASTENERS SHALL BE OF MATERIALS SUITED FOR THE INSTALLATION AREA.	4.22.5. BEAM CLAMPS SHALL SECURE CONDUITS TO EXPOSED STEEL WORK.	4.22.6. FITTINGS SHALL BE MANUFACTURED FOR USE WITH CONDUIT SPECIFIED. MATERIALS AND COATINGS SHALL BE SAME AS CONDUIT.	4.22.7. FACTORY ELBOWS WHERE 90 DEGREE BENDS ARE REQUIRED FOR 25mm AND LARGER CONDUITS.	4.22.8. ALL CONDUITS ENTERING OUTLET BOXES AND DEVICES THAT ARE LOCATED IN WALLS SUBJECT TO MOVEMENT SHALL BE TERMINATED BY MEANS OF LIQUID-TIGHT FLEXIBLE METAL CONDUIT, APPROXIMATELY 450mm IN LENGTH BETWEEN THE CONDUIT AND THE OUTLET BOX OR DEVICE WHICH IS BEING SUPPLIED. ALL CONDUITS, BUS DUCT, WIREWAYS, ETC., PASSING THROUGH OR ACROSS EXPANSION JOINTS OF THE BUILDING SHALL BE INSTALLED WITH THE USE OF APPROVED EXPANSION FITTINGS.	4.22.9. POLYPROPYLENE OF SUFFICIENT DIAMETER AND STRENGTH TO PULL IN FUTURE ADDITIONAL CABLES.	4.23. FASTENING AND SUPPORT	4.23.1. EXPANSIVE SCREW ANCHORS, SHIELDS, OR OTHER FASTENING ITEMS CONTAINING LEAD OR OTHER MATERIAL THAT MIGHT LOSEN OR MELT UNDER FIRE CONDITIONS SHALL NOT BE USED.
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4.23.2. FASTENINGS, SUPPORTS, AND ASSOCIATED HARDWARE SHALL BE OF STAINLESS STEEL OR GALVANIZED STEEL.	4.23.3. FASTENINGS AND SUPPORTS (INCLUDING CHANNELS) AND THEIR ASSOCIATED HARDWARE SHALL BE MADE OF THE SAME MATERIALS TO REDUCE CORROSION POTENTIAL.	4.23.4. SUPPORT CHANNELS, LENGTH AS REQUIRED, U-SHAPED, SIZE AS REQUIRED BY CARRIED LOAD, OR MANUFACTURER'S RECOMMENDATIONS.	4.23.5. SUPPORT EQUIPMENT UNISTRUT SUPPORT HANGING FROM CEILING OR CABLE TRAY OR CABLE CLIPS, SPRING LOADED BOLTS, CABLE CLAMPS ETC., SHALL BE PURPOSE-BUILT ACCESSORIES FOR STANDARD CHANNEL MEMBERS.	4.23.6. BEAM CLAMPS TO SECURE THREADED ROD TO EXPOSED STEEL WORK.	4.23.7. SUPPORT INDIVIDUAL CABLE OR CONDUIT RUNS WITH MINIMUM 6.0mm DIAMETER THREADED RODS AND SPRING CLIPS. USE LARGER DIAMETER ROD AND APPROPRIATE SPRING CLIPS WHERE THE CARRIED LOAD OR MANUFACTURER'S RECOMMENDATIONS REQUIRE.	4.23.8. INSTALL FASTENING AND SUPPORTS AS REQUIRED FOR EACH TYPE OF EQUIPMENT, CABLES AND CONDUIT TO MANUFACTURER'S INSTALLATIONS RECOMMENDATIONS.	4.23.9. PROVIDE METAL BRACKETS, FRAMES, HANGERS, CLAMPS AND RELATED SUPPORT STRUCTURES WHERE INDICATED OR AS REQUIRED TO SUPPORT CONDUIT AND CABLE RUNS.	4.23.10. CROSS-TIE CABLES IN CABLE TRAY AT MAXIMUM 1m SPACING.	4.23.11. PROVIDE ADEQUATE SUPPORT FOR RACEWAYS AND CABLES DROPPED VERTICALLY TO EQUIPMENT WHERE THERE IS NO WALL SUPPORT.	4.23.12. ANY ALUMINUM SUPPORT BRACKET THAT IS IN DIRECT CONTACT WITH CONCRETE SHALL HAVE INERT SPACERS TO REDUCE CHEMICAL REACTION BETWEEN SUPPORT AND CONCRETE.	5. ELECTRICAL DISTRIBUTION EQUIPMENT	5.1. ALL DISTRIBUTION EQUIPMENT AND PANELBOARDS SHALL BE FACTORY ASSEMBLED OF SIZE AND SPECIFICATION INDICATED ON DRAWINGS. ALL EQUIPMENT SHALL BE OF THE SAME MANUFACTURER. ALL EQUIPMENT SHALL BE SPRINKLER PROOF. ALL EQUIPMENT SHALL HAVE TERMINATIONS SUITABLE FOR CONDUCTORS BASED ON 90°C RATED CONDUCTORS. EQUIPMENT BEARING LABELING FOR LOWER TEMPERATURES SHALL BE REJECTED.	5.2. PANELBOARDS: PROVIDE SPRINKLER-PROOF SHIELDING AND WEATHERPROOF TOP ENTRY WIRING METHODS FOR ALL EQUIPMENT. ALL PANELBOARDS SHALL BE LOCKABLE. BALANCE THE LOADS FOR EACH PHASE. RELOCATE CIRCUITS WITHIN PANELBOARDS TO PROPERLY BALANCE THE LOADS. MOUNT ALL SURFACE MOUNTED EQUIPMENT AND PANELBOARDS ON FIRE RESISTANT INTUMESCENT PAINTED BACKBOARDS.	5.3. PROVIDE TYPEWRITTEN PANEL DIRECTORIES IN PANELBOARDS DOORS.	5.4. ALL CIRCUIT BREAKERS SHALL BE BOLT IN PLACE MOLDED CASE, WITH THERMAL AND MAGNETIC TRIPS. TWO AND THREE POLE BREAKERS SHALL HAVE A COMMON SIMULTANEOUS TRIP. MINIMUM RATING SHALL BE 65KAIC SHORT CIRCUIT INTERRUPTING CAPACITY.	6. CEILING HUNG UNISTRUT SUPPORT FOR CABLES	6.1. ALL CEILING HUNG UNISTRUT SUPPORT FOR CABLES SHALL BEAR CERTIFICATION OF CSA OR ULC REQUIREMENTS.	6.2 ALL CEILING HUNG UNISTRUT SUPPORT FOR CABLES SHALL BE ALUMINIUM.	6.2.1 CONFIGURATION: TWO SIDE RAILS WITH TRANSVERSE RUNGS WELDED TO SIDE RAILS.	6.2.2. HORIZONTAL BRACING SPACING: MINIMUM 200mm.	6.2.3. NO PORTION OF THE HORIZONTAL BRACING SHALL PROTRUDE BELOW BOTTOM PLANE OF SIDE RAILS.	6.2.4. MINIMUM CABLE BEARING SURFACE FOR RUNGS: 22mm WIDTH WITH RADIUS EDGES.	6.2.5. HARDWARE FOR ALUMINIUM UNISTRUT SUPPORT USED OUTDOORS: STAINLESS STEEL, TYPE 316, ASTM F593 AND ASTM F 594.	6.3 LOCATION OF CEILING HUNG UNISTRUT SUPPORT FOR CABLES	6.3.1 THE DRAWINGS DO NOT SHOW SPECIFIC CEILING HUNG UNISTRUT ROUTING. ROUTING SHOWN IS FOR REFERENCE ONLY AND CONTRACTOR SHALL NEED TO FIELD VERIFY SPECIFIC ROUTING. COORDINATE ALL ROUTING WITH MECHANICAL CONTRACTOR TO AVOID INTERFERENCE AND TAKE ADVANTAGE OF PRE-HUNG PIPE RACKING. IT IS ACCEPTABLE TO INSTALL UNISTRUT SUPPORT HUNG FROM CEILING ABOVE PIPE RACKING.	6.4 SCOPE	6.4.1 FURNISH ALL LABOUR, MATERIALS, SUPERVISION, EQUIPMENT AND SERVICES SPECIFIED, INDICATED OR REQUESTED TO INSTALL A COMPLETE SYSTEM. CEILING HUNG UNISTRUT SUPPORT SYSTEMS) SHALL BE COMPRISED OF THE SUPPLY AND INSTALLATION OF ALL TRAY SECTIONS, FITTINGS, SUPPORTS, HANGERS AND MISCELLANEOUS SUPPORT MATERIALS, ADAPTORS, AND HARDWARE REQUIRED.	6.4.2 COORDINATE CEILING HUNG UNISTRUT SUPPORT SYSTEM LOCATION WITH OTHER TRADES TO ENSURE THERE IS NO INTERFERENCE WITH OTHER MECHANICAL OR STRUCTURAL COMPONENTS.	6.4.3. WHERE SHARED CEILING HUNG UNISTRUT SUPPORT SYSTEM IS USED PROVIDE SEPARATION BARRIER BETWEEN CABLES OF DIFFERENT VOLTAGES.	6.4.4. CEILING HUNG UNISTRUT SUPPORT SYSTEM SHALL HAVE MINIMUM 30% SPARE SPACE FOR FUTURE.	6.4.5 PROVIDE BONDING CONDUCTORS AS REQUIRED.	7. WIRE AND CABLE	7.1. LOW VOLTAGE WIRE 1000 VOLT AND BELOW	7.1.1. ALL WIRE AND CABLE SHALL HAVE CSA, cUL, OR ETL CERTIFICATION.	7.1.2. ALL WIRE SHALL HAVE STRANDED, ANNEALED COPPER, CROSS LINKED POLYETHYLENE (XLPE) INSULATION, -40°C RATED, 90°C MAXIMUM CONDUCTOR TEMPERATURE RATED, LIMITED FLAME SPREAD, ALUMINIUM CONDUCTORS NOT PERMITTED.	7.1.3. EXCEPT WHERE OTHERWISE STATED, THE MINIMUM CONDUCTOR INSULATION RATING SHALL BE EQUAL TO OR GREATER THAN THE HIGHEST VOLTAGE TO WHICH THE INSULATION MAY BE EXPOSED, BUT IN NO CASE LESS THAN 300V.	7.1.4. THE WIRING SHALL BE SUITABLE FOR INSTALLATION IN THE AREA IN WHICH IT IS INSTALLED.	7.1.5. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG UNLESS OTHERWISE SPECIFIED. #14 AWG COPPER MAY BE USED FOR CONTROL, POWER WIRING, UNLESS OTHERWISE SPECIFIED.	7.1.6. MINIMUM FIELD INSTRUMENTATION WIRE SIZE SHALL BE #16 AWG. ANALOG SIGNAL WIRES SHALL BE TWISTED SHIELDED PAIR OR TWISTED SHIELDED TRIAD AS REQUIRED.	7.1.7. COLOUR CODING OF INSULATED CONDUCTORS SHALL CONFORM TO ELECTRICAL CODE.	7.1.8. INSULATED GROUND CONDUCTORS FORMING PART OF A MULTI CONDUCTOR CABLE ASSEMBLY SHALL HAVE GREEN COLOUR CODING.	7.1.9. APPROVED CABLE AND WIRE MANUFACTURERS ARE: NEXANS CANADA, PHILLIPS CABLES LTD., PRYSMIAN FP, GENERAL CABLE INC. AND SOUTHWIRE.
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8. DEMOLITION			
8.1. PROVIDE ELECTRICAL DEMOLITION TO ACCOMMODATE NEW CONSTRUCTION/ RENOVATIONS. ALL ITEMS REQUIRED TO BE DEMOLISHED ARE NOT NECESSARILY SHOWN. THOSE INDICATED ARE FOR REFERENCE ONLY. ALL ITEMS INTERFERING WITH NEW CONSTRUCTION SHALL BE REMOVED AT NO ADDITIONAL COST. EXAMINE THE SITE AND LOCAL CONDITIONS TO ESTABLISH ALL INFORMATION PERTAINING TO THE ELECTRICAL DEMOLITION SCOPE OF WORK. NO EXTRA COMPENSATION SHALL BE ALLOWED DUE TO FAILURE TO MAKE THIS EXAMINATION.			
9. MISCELLANEOUS MECHANICAL SYSTEMS			
9.1. PROVIDE ALL LABOUR AND MATERIALS AS NECESSARY TO INSTALL, WIRE, CONNECT AND PUT INTO SATISFACTORY OPERATION THE CONTROL PANELS AND MECHANICAL EQUIPMENT SUPPLIED UNDER OTHER DIVISIONS, INCLUDING:			
9.1.1. ELECTRICAL MOTORS AND ACTUATED VALVES.			
9.1.2. MOTOR STARTERS, CONTACTORS AND INTERLOCKS WHERE SPECIFIED AS COMPONENTS OF "PACKAGED" EQUIPMENT.			
9.1.3. MISCELLANEOUS PLUMBING AND HVAC EQUIPMENT INCLUDING FANS, HOT WATER TANKS, AIR HANDLING UNITS, ETC.			
END OF SECTION			

 Alliance ENGINEERING SERVICES INC		 CITY OF WINNIPEG 2777 Portage Avenue, Winnipeg, MB, R3J 0R3	
 BREAK ENGINEERING		GRANT'S OLD MILL MAINTENANCE BUILDING RENOVATION ELECTRICAL SPECIFICATIONS	
CHECKED D.S.	SIZE	DWG. NO. E4.0	
APPROVED D.S.	SCALE AS NOTED	SHEET	REV 0

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