



PUMPS P-5 AND P-6 DISCONNECTS IN MCC PHOTO #1



PUMP P-1 DISCONNECT IN MCC PHOTO # 2



EXISTING BOILER #2 PHOTO #3

### **KEYNOTES:**

- SUPPLY AND INSTALL ELECTRICAL CONNECTIONS TO NEW BOILER.
- 2 DISCONNECT EXISTING PUMP P-6 AND SUPPLY AND INSTALL ELECTRICAL CONNECTIONS TO NEW AH-2
- HEATING COIL PUMP P-6. DISCONNECT EXISTING PUMPS P-1 & P-2 AND SUPPLY AND INSTALL ELECTRICAL CONNECTIONS TO NEW HEATING WATER PUMPS P-1 & P-2. EACH PUMPS VFD TO
- 4 DISCONNECT EXISTING PUMP P-5 AND SUPPLY AND INSTALL ELECTRICAL CONNECTIONS TO NEW AH-2 HEATING COIL PUMP P-5.

BE ON WALL BEHIND PUMP.

- RELOCATE EXISTING DHWR PUMP EX-P-3 TO THIS LOCATION. RE-ROUTE EXISTING DOMESTIC HOT WATER RETURN PIPING TO SUITE. REMOVE ABANDONED SUPPORTS AND HANGERS.
- 6 EXISTING MCC. REPLACE EXISTING DISCONNECTS FOR PUMPS P-1, P-2, P-5, AND P-6 IN HERE. MCC IS A KLOCKNER MOELLER SERIES 200, 208V 3PHASE MODEL. 7 EXISTING BOILERS ARE FED FROM PANEL D CIRCUIT 10. DISCONNECT EXISTING BOILERS AND RECONNECT NEW
- 8 SUPPLY AND INSTALL A NEW 1P-20A BREAKER IN SPARE SPACE IN PANEL E FOR BOILER B-2.

TO BOILER B-1 WITH A NEW 1P-20A CIRCUIT FROM THIS

### **GENERAL NOTES:**

- COORDINATE LOCATIONS OF ALL EQUIPMENT WITH THE MECHANICAL CONTRACTOR. REFER TO MECHANICAL DRAWINGS FOR FURTHER INFORMATION.
- CONFIRM SIZES OF ALL WIRING AND FUSING WITH SHOP DRAWINGS PRIOR TO INSTALLATION. ALLOW FOR THE UPSIZE IN WIRING FOR P-1 AND P-2. CONFIRM ONSITE IF THIS IS REQUIRED.
- THE OWNER OR A REPRESENTATIVE(S) SHALL HAVE ACCESS TO THE WORK IN PROGRESS AT ALL TIMES AND SHALL RESERVE THE RIGHT TO INSPECT THIS WORK AT ANY TIME FOR COMPLIANCE WITH ALL REQUIREMENTS OF THE SPECIFICATION. HE OR SHE SHALL ALSO RESERVE THE RIGHT TO APPROVE EACH PHASE OF THE WORK BEFORE FURTHER WORK MAY BE DONE, TO HALT ALL WORK DEEMED TO BE IMPROPER OR NOT IN COMPLIANCE WITH THE PROJECT, AND TO REQUIRE THAT THE CONTRACTOR PROMPTLY CORRECT ALL IMPROPER PRACTICES AND DEFECTIVE OR DEFICIENT WORK.

REFERENCE DRAWINGS FOR BEST PLOTTING RESULTS, BE SURE TO USE WILLIAMS ENGINEERING CANADA AUTOCAD PLOT CONFIGURATION FILES AVAILABLE FROM: www.williamsengineering.com INFORMATION CONTAINED ON THIS DRAWING IS COPYRIGHTED PROJECT. UNAUTHORIZED USE OF THIS INFORMATION WILL BE CONSIDERED A BREACH OF COPYRIGHT AND MAY BE PURSUED AS SUCH. USE OF THIS INFORMATION FOR ANY OTHER PURPOSE OTHER THAN THIS PARTICULAR PROJECT IS AT THE RISK OF THE EDMONTON OFFICE Suite #1700 10065 - Jasper Avenue Edmonton, AB T5J 3B1 WILLIAMS **ENGINEERING** Bus: (780) 424-2393 Toll Free: 1-800-263-2393 Fax: (780) 425-1520 CHINOOK'S EDGE SHOOL SCHOOL DIVISION INNISFAIL, AB

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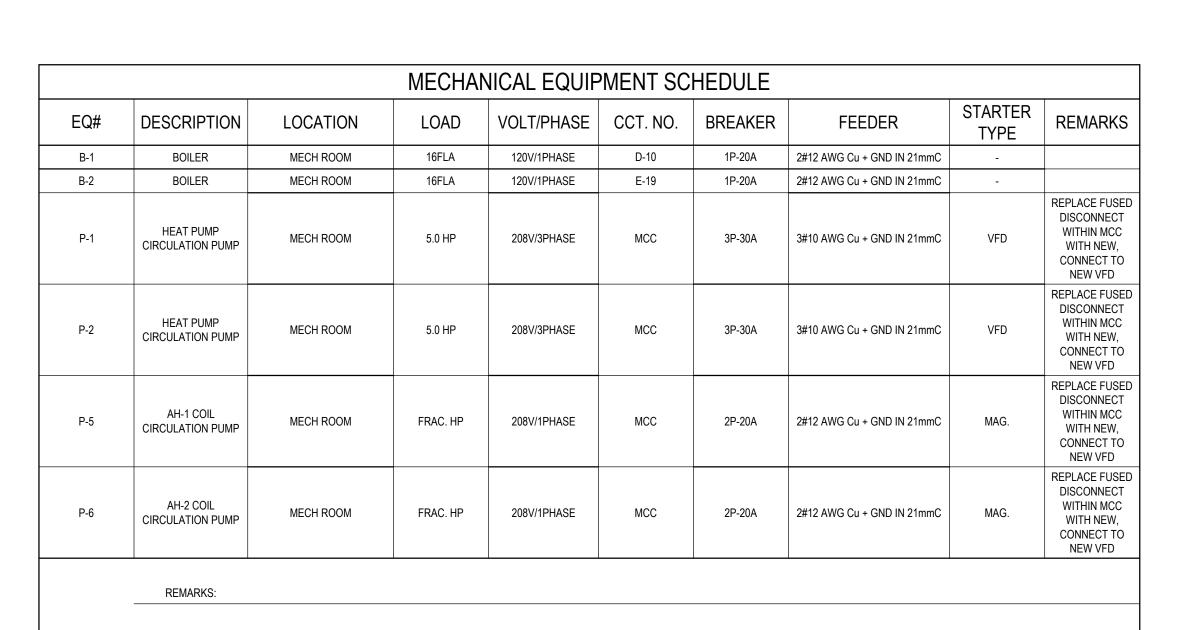
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BOILER REPLACEMENT E'COLE STEFFIE WOIMA ELEMENTARY SCHOOL 4720 45TH AVENUE SYLVAN LAKE, AB

> ELECTRICAL **REVISION PLAN** AND PHOTOS

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#### GENERAL:

- 1.1. GENERAL REQUIREMENTS, INSTRUCTIONS TO BIDDERS, THIS SPECIFICATION AND ANY ADDENDA HERETO FORM PART OF THE CONTRACT DOCUMENTS AND SHALL BE READ IN CONJUNCTION WITH THEM. WORK TO INCLUDE THE FURNISHING OF ALL LABOUR AND MATERIALS. UNLESS SPECIFIED OTHERWISE. TO COMPLETE AND PUT INTO OPERATING CONDITION ALL ELECTRICAL SYSTEMS AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN.
- 1.2. IT IS THE INTENT OF THE WORK TO PROVIDE COMPLETE, NEATLY FINISHED, AND OPERATIONAL SYSTEMS AND ANY LABOUR, MATERIAL, PERMITS, LICENSES, APPROVALS AND INSPECTIONS REQUIRED FOR COMPLETION OF THE WORK, WHETHER SPECIFICALLY MENTIONED IN THE DRAWINGS OR SPECIFICATIONS OR NOT, ARE TO BE INCLUDED IN THE TENDERED PRICE.
- 1.3. RESPONSIBILITY AS TO WHICH TRADE PROVIDES ARTICLES OR MATERIALS RESTS SOLELY WITH THE GENERAL CONTRACTOR. EXTRAS WILL NOT BE CONSIDERED BASED ON GROUNDS OF DIFFERENCE OF INTERPRETATION OF SPECIFICATIONS AS TO WHICH TRADE INVOLVED SHALL PROVIDE CERTAIN SPECIALTIES OR MATERIALS.
- 1.4. THE DRAWINGS AND SPECIFICATIONS FOR THE COMPLETE WORKS, INCLUDING ALL OF THOSE RELATED TO OTHER TRADES ARE TO BE EXAMINED BEFORE SUBMITTING TENDERS. ALL ELECTRICAL AND COMMUNICATIONS REQUIREMENTS INDICATED ARE TO BE INCLUDED IN THE SCOPE OF THE WORK.

#### 2. DRAWINGS AND SPECIFICATIONS:

- 2.1. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY TO EACH OTHER AND WHAT IS CALLED FOR BY ONE IS TO BE BINDING AS IF CALLED BY BOTH.
- 2.2. SHOULD ANY DISCREPANCY APPEAR BETWEEN DRAWINGS AND SPECIFICATIONS THAT LEAVES THE ELECTRICAL TRADE IN DOUBT AS TO TRUE INTENT AND MEANING, OBTAIN A RULING FROM THE ENGINEER BEFORE SUBMITTING THE TENDER, OR ALLOW FOR THE MOST EXPENSIVE ALTERNATIVE.

#### 3. EXAMINATION OF OTHER DRAWINGS:

3.1. THE ELECTRICAL CONTRACTOR IS TO EXAMINE CAREFULLY STRUCTURAL, ARCHITECTURAL AND MECHANICAL DRAWINGS, AND THE WORK OF OTHER TRADES AND SATISFY HIMSELF THAT THE WORK UNDER THIS CONTRACT CAN BE SATISFACTORILY CARRIED OUT WITHOUT CHANGES TO THE BUILDING AS SHOWN ON THE PLANS. SHOULD ANY DIFFICULTY ARISE SHOWING CONFLICT WITH, OR REQUIRING ADDITIONAL WORK BEYOND THE WORK OF THESE DRAWINGS, BRING THIS MATTER TO THE ATTENTION OF THE ENGINEER BEFORE SUBMITTING TENDER.

### 4. UNIFORMITY OF EQUIPMENT:

4.1. UNLESS OTHERWISE SPECIFIED, UNIFORMITY OF MANUFACTURE IS TO BE MAINTAINED FOR ANY PARTICULAR ITEM THROUGHOUT.

#### 5. CODES, PERMITS AND INSPECTIONS:

- 5.1. THE ENTIRE INSTALLATION, INCLUSIVE OF MATERIAL AND LABOUR, IS TO COMPLY WITH ALL THE REQUIREMENTS OF ALL BUILDING CODES AND AUTHORITIES HAVING JURISDICTION, THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE, AND REGULATIONS OF THE LOCAL INSPECTION DEPARTMENT.
- 5.2. THE ELECTRICAL TRADE IS TO OBTAIN ALL PERMITS REQUIRED FOR EACH STAGE OF WORK, AND AFTER COMPLETION OF THE ENTIRE INSTALLATION FURNISH TO THE ENGINEER A CERTIFICATE OF FINAL INSPECTION AND APPROVAL FROM THE ELECTRICAL INSPECTION DEPARTMENT.

## 6. STANDARDS OF MATERIAL AND WORKMANSHIP:

- 6.1. ALL MATERIALS ARE TO BE NEW AND OF THE QUALITY SPECIFIED, AND SHALL BE APPROVED BY CSA OR EQUIVALENT AGENCY RECOGNIZED IN SK.
- 6.2. ALL WORK SHALL BE EXECUTED IN A NEAT AND WORKMANLIKE MANNER BY QUALIFIED TRADESMEN. THE ELECTRICAL CONTRACTOR SHALL KEEP A COMPETENT FOREMAN AND NECESSARY ASSISTANTS AT SITE DURING THE PROGRESS OF THE WORK.
- 6.3. ALL MATERIAL AND INSTALLATION SHALL MATCH THE BUILDING STANDARD UNLESS IT IS NOTED OTHERWISE ON THE DRAWINGS.

## 7. RECORD PLANS:

- 7.1. THE GENERAL CONTRACTOR WILL FURNISH TO THE ELECTRICAL TRADE ONE SET OF DRAWINGS TO BE USED FOR RECORD PURPOSES. THE ELECTRICAL TRADE IS TO ACCURATELY RECORD ON THESE DRAWINGS ALL REVISIONS TO THE ORIGINAL PLANS THAT ARE MADE ON SITE DURING CONSTRUCTION.
- 7.2. BEFORE COMPLETION AND ACCEPTANCE OF THE PROJECT, FURNISH AN ELECTRICAL SYSTEM OPERATION & MAINTENANCE MANUAL IN A 3-RING BINDER. EACH SYSTEM AND PIECE OF EQUIPMENT REQUIRING ADJUSTMENT OR MAINTENANCE OR WHOSE OPERATION IS NOT READILY APPARENT TO UNSKILLED USERS, OR REQUESTED BY THE OWNER'S REPRESENTATIVE, SHALL EACH BE COVERED BY A SEPARATE SECTION IN THE MANUAL. THREE SUCH MANUALS ARE REQUIRED. O&M MANUAL TO INCLUDE RECORD DRAWINGS IN BOTH PAPER AND ELECTRONIC (PDF AND AUTOCAD) FORMAT.

# 8. SHOP DRAWINGS:

8.1. THE ELECTRICAL CONTRACTOR IS TO SUBMIT TO THE ENGINEER, FOR REVIEW, SHOP DRAWINGS OF MAJOR ELECTRICAL EQUIPMENT. SUCH EQUIPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO

POWER DISTRIBUTION MOTOR STARTERS/DISCONNECTS

## OR OTHER SYSTEMS AS REQUESTED BY THE ENGINEER.

- 8.1. ALL DRAWINGS ARE TO BE SUBMITTED IN TRIPLICATE OR BY EMAIL. SUBMIT ADDITIONAL COPIES FOR APPROVAL AS REQUIRED.
- 8.2. THE ENGINEER'S REVIEW OF SHOP DRAWINGS IS TO BE FOR ELECTRICAL SPECIFICATIONS ONLY AND WILL NOT RELIEVE THE ELECTRICAL TRADE OR SUPPLIERS FROM RESPONSIBILITY FOR ERRORS, PROPER FITTING, CONSTRUCTION OF WORK, AND FURNISHING OF MATERIALS. REVIEW WILL NOT BE CONSTRUED AS APPROVING DEPARTURES FROM CONTRACT DOCUMENT REQUIREMENTS IF SUCH DEPARTURES ARE NOT SPECIFICALLY NOTED. THE ELECTRICAL TRADE IS RESPONSIBLE FOR VERIFYING ALL DIMENSIONS.

## 9. GUARANTEE WARRANTY:

- 9.1. THE ELECTRICAL TRADE SHALL FURNISH A WRITTEN GUARANTEE WARRANTY.
- SIGNED BY AUTHORIZED PERSONNEL, STATING: THAT ALL WORK EXECUTED UNDER THIS CONTRACT WILL BE FREE FROM DEFECTS OF MATERIAL AND WORKMANSHIP FOR A PERIOD OF 1 YEAR FROM
- DATE OF FINAL ACCEPTANCE. THE ABOVE PARTIES FURTHER AGREE TO, AT THEIR OWN EXPENSE, REPAIR AND REPLACE ALL SUCH DEFECTIVE WORK, AND OTHER WORK DAMAGED

- THEREBY, WHICH FAILS OR BECOMES DEFECTIVE DURING THE TERM OF THE GUARANTEE WARRANTY PROVIDED THAT SUCH FAILURE IS NOT DUE TO IMPROPER USAGE.
- THE PERIOD OF THE GUARANTEE SPECIFIED WILL IN NO WAY SUPPLANT ANY OTHER GUARANTEE OF A LONGER PERIOD BUT BE BINDING ON WORK NOT

#### 10. SETTING OUT OF THE WORK:

- 10.1. THE ELECTRICAL TRADES IS RESPONSIBLE FOR CORRECTING ALL WORK COMPLETED CONTRARY TO THE INTENT OF DRAWINGS AND SPECIFICATIONS AND SHALL BEAR ALL COSTS INVOLVED IN MAKING THE CORRECTIONS. WHERE INTENT OF DRAWINGS AND SPECIFICATIONS IS NOT CLEAR, OBTAIN CLARIFICATION FROM THE ENGINEER BEFORE PROCEEDING WITH WORK.
- 10.2. THE ELECTRICAL TRADE IS TO GIVE THE WORK HIS PERSONAL SUPERVISION, LAYOUT HIS OWN WORK, DO ALL NECESSARY LEVELING AND MEASURING OR EMPLOY A COMPETENT ENGINEER TO DO SO. FULL-SIZE AND DETAIL DRAWINGS TO TAKE PRECEDENCE OVER SCALE MEASUREMENTS.
- 10.3. THE ELECTRICAL TRADE SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED TO THE OWNER OR ANY OTHER TRADE BY IMPROPER LOCATION OR CARRYING OUT OF
- 10.4. THE ELECTRICAL TRADE, IN THE SETTING OUT OF HIS WORK, IS TO MAKE REFERENCE TO ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DRAWINGS. HE SHALL CONSULT WITH ALL RELEVANT TRADES IN SETTING OUT LOCATIONS FOR CONDUIT RUNS, LUMINAIRES, PANEL ASSEMBLIES, AND ALL OTHER ELECTRICAL EQUIPMENT, SO THAT CONFLICTS ARE AVOIDED AND SYMMETRICAL SPACING IS
- 10.5. THE ELECTRICAL TRADE SHALL CONFIRM OUTLET LOCATIONS AND MOUNTING HEIGHTS WITH THE PROJECT COORDINATOR ON-SITE PRIOR TO INSTALLATION.

### 11. NOT USED

#### 13. CUTTING AND PATCHING:

- THE GENERAL TRADE WILL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR ELECTRICAL INSTALLATION. STRUCTURAL MEMBERS MUST NOT BE CUT WITHOUT CONSENT OF THE ENGINEER.
- WHERE WORK DONE BY THE ELECTRICAL TRADE DAMAGES THE WORK OF OTHER TRADES, THE ELECTRICAL TRADE SHALL REPAIR AND MAKE GOOD SUCH DAMAGE TO THE SATISFACTION OF EACH TRADE CONCERNED AND THE ENGINEER.
- 13.3. ALL WALL PENETRATIONS SHALL BE SEALED WITH APPROVED FIRE STOP MATERIAL

#### 14. MECHANICAL EQUIPMENT:

- UNLESS SPECIFIED OTHERWISE, THE ELECTRICAL CONTRACTOR IS TO SUPPLY AND INSTALL ALL REQUIRED CONDUIT, WIRING, ELECTRICAL FITTINGS AND CONNECTIONS FOR ALL MOTORS AND OTHER HVAC EQUIPMENT, EVEN THOUGH SUCH MOTORS AND OTHER HVAC EQUIPMENT MAY BE SUPPLIED BY OTHERS.
- WHERE REQUIRED BY THE DRAWINGS OR APPLICABLE REGULATIONS, DISCONNECT SWITCHES, STARTERS, OVERLOAD RELAYS AND OTHER NECESSARY PROTECTIVE DEVICES ARE TO BE SUPPLIED AND INSTALL BY THE ELECTRICAL CONTRACTOR. MOTORS AND CONTROLS SHALL BE FURNISHED BY THE SUPPLIER OF THE DRIVEN EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL INCLUDE ALL WORK AND CONNECTIONS REQUIRED TO MAKE THE SYSTEM COMPLETE AND OPERATIONAL. ALL CONTROL WIRING BY THIS CONTRACTOR, CONFIRM ALL REQUIREMENTS WITH
- THE ELECTRICAL EQUIPMENT MAY INCLUDE BUT NOT BE LIMITED TO SUCH ITEMS AS LOUVER MOTORS AND INTERLOCKS, STARTING DEVICES, MOTOR CONTROLLERS, FLOAT SWITCHES, ALARM DEVICES OR SYSTEMS, PUSH BUTTONS, EXHAUST FANS, DATA SYSTEMS, AND INTERCOMS.
- 14.4. THE ELECTRICAL CONTRACTOR IS TO CONFIRM MOTOR (OR OTHER EQUIPMENT) LOCATION AND SIZES WITH THE TRADE SUPPLYING THE MOTOR (OR OTHER EQUIPMENT) BEFORE COMMENCING ANY ASSOCIATED ELECTRICAL WORK.

## 15. TESTS:

- 16.1 ALL PORTIONS OF ELECTRICAL WORK ARE TO BE TESTED BY THE ELECTRICAL TRADE FOR SATISFACTORY OPERATION.
- BEFORE ENERGIZING ANY PORTION OF THE ELECTRICAL SYSTEM, THE ELECTRICAL TRADE SHALL PERFORM MEGGER TESTS ON ALL FEEDERS AND BRANCH CIRCUITS. ANY PROBLEMS DISCOVERED BY SUCH TESTING ARE TO BE CORRECTED BY THE ELECTRICAL TRADE AND THE CIRCUITS IN QUESTION RETESTED. THE RESULTS OF ALL FINAL TESTING SHALL BE PROVIDED TO THE THE ENGINEER IN REPORT FORM.
- 16.3 UPON PROJECT COMPLETION, AND IMMEDIATELY PRIOR TO FINAL INSPECTION AND TAKEOVER, THE ELECTRICAL TRADE SHALL CHECK THE LOAD BALANCE ON ALL FEEDERS AND AT DISTRIBUTION CENTRES, LOAD CENTRES, AND PANELS. THESE CHECKS ARE TO BE CARRIED OUT BY TURNING ON ALL LOADS AND CHECKING LOAD CURRENT BALANCE. IF LOAD UNBALANCE EXCEEDS 15%, THE CIRCUITS ARE TO BE RECONFIGURED AS NECESSARY TO BALANCE THE LOADS. ALL CHANGES MUST BE RECORDED ON AS-BUILT DRAWINGS, AND MEASURED LOADS ON EACH PHASE PROVIDED TO THE ENGINEER IN REPORT FORM.

## 16. PAINTING AND FINISHES:

- 17.1 ALL ELECTRICAL FITTINGS, SUPPORTS, HANGER RODS, PULLBOXES, CHANNEL FRAMES, CONDUIT RACKS, OUTLET BOXES, BRACKETS, AND CLAMPS ARE TO HAVE A GALVANIZED FINISH OR A PAINT FINISH OVER CORROSION-RESISTANT PRIMER.
- ALL PANELS ARE TO BE FACTORY-FINISHED WITH SPRAYED-ON AIR-DRY ENAMEL. ALL ENAMEL TO BE APPLIED OVER CORROSION-RESISTANT PRIMER. MATTE OF FLAT TYPE FINISH PAINT WILL NOT BE ACCEPTED. ALL PANELS OR SIMILAR FACTORY-FINISHED UNITS THAT ARE SCRATCHED OR MARKED DURING INSTALLATION ARE TO BE TOUCHED-UP WITH MATCHING SPRAY-ON AIR-DRY LACQUER AND, IF REQUIRED TO PROVIDE A SATISFACTORY JOB, TO BE COMPLETELY REFINISHED.
- 17.3 ALL 120/208V PANELBOARDS, PULLBOXES AND OTHER ELECTRICAL CABINETS AND BOXES ARE TO BE FINISHED IN GREY ENAMEL.

## 17. CLEANUP:

- THE ELECTRICAL TRADE AND ITS SUB-TRADES ARE TO KEEP THE SITE FREE DURING CONSTRUCTION OF DEBRIS, BOXES, PACKING, AND OTHER MATERIALS ASSOCIATED WITH THE WORK OF THIS TRADE. ALL WASTED MATERIAL IS TO BE DISPOSED OF IN A SAFE AND ENVIRONMENTALLY RESPONSIBLE MANNER.
- 18.2 UPON COMPLETION OF WORK, THE ELECTRICAL INSTALLATION SHALL BE LEFT IN A CLEAN AND FINISHED CONDITION TO THE SATISFACTION OF THE ENGINEER.

## 18. CONDUIT AND EMT:

WHERE REQUIRED BY THE CANADIAN ELECTRICAL CODE, ALL WIRE AND CABLE IS TO BE INSTALLED IN CONDUIT OR EMT. WHERE APPROVED, AC90 OR TECK90 MAY BE USED.

- 19.2 UNLESS OTHERWISE NOTED, CONDUIT AND EMT ARE TO BE CONCEALED IN ALL FINISHED AREAS. IN SERVICE AREAS, CONDUIT AND EMT SHALL BE RUN ON SURFACE UNLESS INDICATED OTHERWISE.
- 19.3 SURFACE MOUNTED CONDUIT AND EMT ARE TO BE INSTALLED PARALLEL TO STRUCTURAL LINES, AND, WHERE BENDS OCCUR IN PARALLEL RUNS, THEY SHALL BE CONCENTRIC.
- 19.4 RACEWAYS ARE TO BE INSTALLED FREE FROM DENTS AND BRUISES AND SHALL HAVE THEIR ENDS CAPPED, PLUGGED, OR SEALED AS NECESSARY TO PREVENT ENTRANCE OF DIRT OR MOISTURE.
- 19.5 IN ALL AREAS SUBJECT TO MOISTURE, WATERTIGHT FITTINGS MUST BE USED.
- ALL RACEWAYS, EXCEPT WHERE OTHERWISE INDICATED, SHALL BE SIZED IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
- TECK90 OR SEAL-TIGHT FLEXIBLE CONDUIT IS TO BE UTILIZED FOR CONNECTIONS TO MOTORS AND MOTOR CONTROLLERS.
- ALL CONDUITS IN SLAB SHOULD BE SPACED SO THAT CONCRETE CAN BE POURED IN BETWEEN AND UNDER.
- 19.8 WHERE CONDUITS ARE INSTALLED IN CONCRETE SLABS OR CROSS-STRUCTURAL EXPANSION JOINTS, AN APPROVED EXPANSION FITTING SHALL BE INSTALLED.

### 19. IDENTIFICATION:

- 21.1 IDENTIFY ALL MAJOR PIECES OF EQUIPMENT, INCLUDING BUT NOT LIMITED TO PANELBOARDS, ELECTRICAL CABINETS, RECEPTACLES, MECHANICAL EQUIPMENT SWITCHED AND BREAKERS IN PANELBOARDS. PROVIDE LAMACOID NAMEPLATE FOR
- 21.2 IDENTIFY BRANCH CIRCUIT WIRES TO MEET CODE REQUIREMENTS.

### 20. WIRE AND CABLE:

- 22.1 ALL BUILDING WIRING IS TO BE COPPER OF TYPE R90, RW90, AC90 (IN COMBUSTIBLE CONSTRUCTION ONLY), OR T90, EXCEPT WHERE NOTED OTHERWISE.
- A MINIMUM CONDUCTOR SIZE OF #12 AWG COPPER IS TO BE USED, EXCEPT WHERE NOTED OTHERWISE.
- ALL CONDUCTORS ARE TO BE COLOUR-CODED THROUGHOUT THE INSTALLATION. EQUIPMENT GROUNDING CONDUCTOR SHALL BE GREEN IN COLOUR.
- NEUTRAL CONDUCTOR SHALL BE WHITE IN COLOUR. 120/208V PHASE WIRES SHALL BE RED, BLACK, AND BLUE.

#### 21. PULLBOXES:

21.1. THE ELECTRICAL TRADE SHALL SUPPLY AND INSTALL PULLBOXES AS REQUIRED TO SUIT JOB CONDITIONS. PULLBOXES SHALL CONFORM TO CANADIAN ELECTRICAL CODE REQUIREMENTS.

### 22. SUPPORTS:

- 22.1. ALL CONDUIT, RACEWAYS, AND OTHER ELECTRICAL EQUIPMENT SHALL BE SECURELY AND ADEQUATELY SUPPORTED, IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
- 22.2. WHERE INSERTS ARE REQUIRED IN CONCRETE, EXPANSION INSERTS, LEAD INSERTS OR PLASTIC INSERTS ARE TO BE USED IN DRILLED HOLES. SHOT DRIVEN PINS MAY BE USED IN STRUCTURAL CONCRETE ONLY WITH THE PERMISSION OF THE ENGINEER.

## 23. GROUNDING AND BONDING:

- 23.1. A COMPLETE GROUNDING AND BONDING SYSTEM SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ELECTRICAL INSPECTION DEPARTMENT.
- 23.2. ALL METAL PARTS NOT CARRYING CURRENT, INCLUDING BUT NOT LIMITED TO. SECONDARY FEEDER CIRCUITS, EQUIPMENT AND PANELBOARD ENCLOSURES, METAL RACEWAYS, PULL AND JUNCTION BOXES, SHALL BE PROPERLY GROUNDED. METAL RACEWAYS SHALL UTILIZE DOUBLE LOCKNUTS AND OTHER FITTINGS WHERE NECESSARY TO PROVIDE GROUND CONTINUITY.
- 23.3. A SEPARATE GROUND CONDUCTOR SHALL BE INSTALLED IN ALL RACEWAY FEEDER RUNS. FLEXIBLE CONDUIT. AND IN CONDUIT INSTALLED IN SLAB OR UNDERGROUND.

## 24. PANELS:

- 24.1. EXCEPT WHERE INDICATED OTHERWISE, PANELS ARE TO BE 120/208VOLT, 3 PHASE, 4 WIRE, SOLID FULL-CAPACITY NEUTRAL DESIGN WITH SEQUENCE-STYLE BUSSING, COMPOSED OF AN ASSEMBLY OF MOLDED CASE CIRCUIT BREAKERS AS INDICATED WITH THERMAL AND MAGNETIC TRIP. REUSE EXISTING PANELS AND PROVIDE NEW BREAKERS OR DISCONNECTS AS
- TYPEWRITTEN OR EXCEL-WORKSHEET PANEL DIRECTORIES SHALL BE PROVIDED FOR ALL PANELS.
  - PROVIDE LAMACOID NAMEPLATE ON EACH PANEL COVER TO IDENTIFY PANEL NAME, NUMBER OF PHASES, VOLTAGE, CURRENT RATING AND POWER SOURCE.

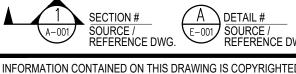
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**SPECIFICATIONS**