ELECTRICAL SPECIFICATION

CODES AND STANDARDS

1. CONTRACTOR SHALL APPLY THE FOLLOWING CODES AND STANDARDS AS APPLICABLE. ALL EDITIONS REFERENCED MUST BE THE CURRENT EDITION OF EACH.
   - 1.1. CSA 22.1 CANADIAN ELECTRICAL CODE PART 1.
   - 1.2. CITY OF WINNIPEG ELECTRICAL BY-LAW COMPLETE WITH TECHNICAL INTERPRETATION.
   - 1.3. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT ELECTRICAL DESIGN GUIDE REVISION 2.
   - 1.4. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT IDENTIFICATION STANDARD REVISION 2.
   - 1.5. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT WASTEWATER TREATMENT FACILITIES AUTOMATION DESIGN GUIDE.
   - 1.6. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT AUTOMATION MASTER PLAN.
   - 1.7. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT HMI LAYOUT AND ANIMATION PLAN.
   - 1.8. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT TAG NAMING STANDARD REV.00.
   - 1.9. THE CITY OF WINNIPEG WATER & WASTE DEPARTMENT - ELECTRICAL TESTING REQUIREMENTS.
   - 1.10. NFPA.
   - 1.11. WORK PLACE HEALTH AND SAFETY ACT.
   - 1.12. MANITOBA BUILDING CODE

GENERAL

1. DEMOLITION
   - 1.1. ELECTRICAL CONTRACTOR TO VISIT SITE AND INCLUDE REMOVAL OF ALL ELECTRICAL EQUIPMENT BEING DELETED. DELETE ALL WIRING NOT BEING USED FROM DEVICES BACK TO SOURCE.
   - 1.2. REVIEW DEMOLITION DRAWING NOTES AND DETAILS.
   - 1.3. COORDINATE WITH THE CITY OF WINNIPEG PRIOR REMOVAL OF ANY ELECTRICAL EQUIPMENT.

2. CLEANING
   - 2.1. MAINTAIN THE WORK IN TIDY CONDITION FREE FROM THE ACCUMULATION OF WASTE PRODUCTS AND DEBRIS, OTHER THAN THAT CAUSED BY THE CITY OF WINNIPEG OR OTHER SUBCONTRACTORS NOT ASSOCIATED WITH THIS PROJECT.
   - 2.2. REMOVE WASTE MATERIAL AND DEBRIS FROM SITE AND DEPOSIT IN WASTE CONTAINERS AT END OF EACH WORKING DAY.
   - 2.3. KEEP WORKING AND MATERIAL STORAGE AREAS FREE OF CLUTTER AND TRIPPING HAZARDS.

3. SHOP DRAWINGS
   - 3.1. SUBMIT ALL ELECTRICAL MATERIAL SHOP DRAWINGS TO THE CONTRACT ADMINISTRATOR FOR APPROVAL BEFORE ORDERING MATERIAL.

4. JOB COMPLETION
   - 4.1. AT THE COMPLETION OF THE JOB THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL WORK AREAS, RESTORING ANY DAMAGED OR DEFACED SURFACES OF FIXTURES OR EQUIPMENT TO THEIR ORIGINAL CONDITION. THE SUBCONTRACTOR SHALL REMOVE ALL TEMPORARY SYSTEMS UNLESS THE CITY SPECIFICALLY REQUESTS THAT THEY BE LEFT IN PLACE.
   - 4.2. THE CONTRACTOR SHALL THOROUGHLY TEST ALL NEW ELECTRICAL SYSTEMS, INCLUDING THOSE INSTALLED BY OTHERS AND WIRED BY ELECTRICAL CONTRACTOR. CORRECT ALL FAULTY CONDITIONS AT NO EXTRA COST. ALL PANELS SHALL BE BALANCED SO THAT THERE IS NO MORE THAN 10% DIFFERENCE IN PHASE CURRENTS UNDER NORMAL OPERATING CONDITIONS. MODIFY PANEL SCHEDULES AS REQUIRED.
   - 4.3. THE CONTRACTOR SHALL DEMONSTRATE TO THE OWNER REPRESENTATIVE THAT ALL ELECTRICAL DEVICES AND SYSTEMS ARE FULLY FUNCTIONAL, AND SHALL GIVE INSTRUCTIONS IN THEIR OPERATION AS REQUESTED.
   - 4.4. THE CONTRACTOR SHALL OBTAIN, AND GIVE TO THE CONTRACT ADMINISTRATOR, AN INSPECTION CERTIFICATE COVERING ALL NEW ELECTRICAL WORK. THE CONTRACTOR SHALL CORRECT ANY DEFICIENCIES NOTED BY THE INSPECTOR, AT NO EXTRA COST, UNTIL SUCH CERTIFICATE IS RECEIVED. CONTRACTOR TO INCLUDE ALL PERMIT COST ASSOCIATED WITH THE WORK.
   - 4.5. ALL WORK SHALL BE GUARANTEED TO BE FULLY OPERATIONAL AND FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE.

5. SUBSTITUTIONS
   - 5.1. THE CONTRACTOR IS REQUIRED TO BID ON THIS PROJECT WITH THE UNDERSTANDING THAT ALL EQUIPMENT WILL BE PROVIDED AS SPECIFIED.
   - 5.2. ANY SUBSTITUTIONS FROM THE SPECIFIED ITEMS MUST BE INCLUDED WITH A NUMBER INDICATING THE SAVINGS OVER THE SPECIFIED ITEMS THAT THE CITY WILL REALIZE.
   - 5.3. THIS PROVISION IS REQUIRED FOR ALL SPECIFIED ITEMS INCLUDING BUT NOT LIMITED TO SUBSTITUTED "EQUALS", DISTRIBUTION EQUIPMENT, LIGHTING FIXTURES, PANELS AND FIRE ALARM EQUIPMENT.

SCOPE OF WORK

1. THE ELECTRICAL CONTRACTOR SHALL DEMOLISH ALL ELECTRICAL EQUIPMENT ON THE MAIN FLOOR AND INSIDE THE DRY WELL EXCEPT OF THOSE RE-USE EQUIPMENT AND ASSOCIATED WIRING. SEE NOTE SHOWN ON DEMOLITION DRAWING E1001.

2. THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, TOOLS, SUPERVISION, ETC. REQUIRED TO INSTALL COMPLETE OPERATIONAL ELECTRICAL SYSTEMS AS DESCRIBED IN THESE PLANS AND SPECIFICATIONS. SUCH INSTALLATIONS SHALL INCLUDE, BUT ARE NOT SPECIFICALLY LIMITED TO THE FOLLOWING:

   - 2.1. NEW EQUIPMENT AND SYSTEMS INCLUDED IN THE SCOPE OF WORK FOR THIS PROJECT.
     - 2.1.1. MOTOR CONTROL CENTER (MCC)
     - 2.1.2. TRANSFORMER
     - 2.1.3. PANELBOARD
     - 2.1.4. LIGHT FIXTURES
     - 2.1.5. PLC CONTROL PANEL
     - 2.1.6. UPS
     - 2.1.7. SMOKE DETECTORS
     - 2.1.8. FLOOD SENSOR
     - 2.1.9. RECEPTACLES
     - 2.1.10. LIGHT SWITCHES
     - 2.1.11. JUNCTION BOXES
     - 2.1.12. UNTRASONIC LEVEL SENSOR
     - 2.1.13. HEATING/CIRCULATION SYSTEM CONTROL PANEL
     - 2.1.14. EXHAUST/COOLING SYSTEM CONTROL PANEL
   - 2.2. RE-USE EQUIPMENT AND SYSTEMS INCLUDED IN THE SCOPE OF WORK FOR THIS PROJECT.
     - 2.2.1. TERMINATION (CS0) PANEL
     - 2.2.2. BUBBLER LEVEL SYSTEM
     - 2.2.3. FLOOD PUMPS
     - 2.2.4. "HI WET WELL" FLOAT SWITCH
     - 2.2.5. PHONE LINE
   - 2.3. SUPPLY AND INSTALL OF POWER AND CONTROL WIRING FOR THE HVAC EQUIPMENT. COORDINATE ALL WORK WITH MECHANICAL CONTRACTOR.
   - 2.4. SUPPLY AND INSTALL OF ALL RACEWAYS, JUNCTION BOXES, PULL BOXES, ETC. REQUIRED FOR THE AFOREMENTIONED EQUIPMENT.
   - 2.5. SUPPLY AND INSTALL OF ALL POWER, CONTROL, INSTRUMENTATION AND COMMUNICATION WIRING WHEREVER REQUIRED FOR THIS PROJECT.
   - 2.6. CUTTING, CHANNELING, CORING AND CHASING REQUIRED TO ACCOMMODATE THE INSTALLATION OF ELECTRICAL WORK AND ROUGH PATCHING INCLUDING RESTORATION OF ALL BUILDING ENVELOPE TO MAINTAIN REQUIRED SEPARATIONS.
   - 2.7. SUPPLY AND INSTALL OF ANY REQUIRED ELECTRICAL DISTRIBUTION EQUIPMENT.

PRODUCTS AND EXECUTION

1. ALL ELECTRICAL MATERIAL AND INSTALLATION METHODS MUST COMPLIANT WITH THE CITY OF WINNIPEG ELECTRICAL DESIGN GUIDE'S REQUIREMENT FOR FLOOD PUMPING STATION.

2. MOTOR CONTROL CENTER MCC
   - 2.1. MCC MUST BE COMPLIANT WITH THE CITY OF WINNIPEG, THE ELECTRICAL DESIGN GUIDE'S REQUIREMENT ESPECIALLY THE FOLLOWING SECTIONS;
     - 2.1.1. SECTION 2.3 IDENTIFICATION.
     - 2.1.2. SECTION 6.3.1 LOW VOLTAGE MCC (600V) -
       - 2.1.2.1. THE MCC IS NOT SMART/INTELLIGENT MCC
       - 2.1.2.2. THE MCC SHALL BE SERVICE ENTRANCE RATED.
     - 2.1.3. SECTION 6.4 MOULDED CASE CIRCUIT BREAKERS.
     - 2.1.4. SECTION 6.8 SOFT STARTER
     - 2.1.5. SECTION 6.12 TVSS
     - 2.1.6. SECTION 7.10 EMERGENCY STOP SYSTEMS REQUIREMENT
     - 2.1.7. SECTION 9 POWER SYSTEM MONITORING - PILOT LIGHTS (TABLE 9-1 WASTEWATER COLUMN), POWER METER REQUIREMENT, EQUIPMENT STATUS MONITORING.
     - 2.1.8. SECTION 10.3 PROTECTION FOR DISTRIBUTION <=600V
   - 2.2. THE MCC SHALL BE 600V 3Ø 3W 42kA.
   - 2.3. THE MCC SHALL COMPLIANT WITH THE SINGLE LINE DRAWING.
   - 2.4. PROVIDE COOLING FANS FOR SOFT STARTER CELLS, IF REQUIRED, THE TEMPERATURE IN THIS LOCATION COULD APPROACH 40°C.
   - 2.5. IF THE POWER METER INCLUDES ALL POWER FAILURE MODES AND THE DRY ALARM CONTACT (NC) OF THE ABB SSAC WVM0121AL VOLTAGE MONITORING RELAY, THE ABB VOLTAGE MONITORING RELAY IS NOT REQUIRED.
   - 2.6. PILOT LIGHT COLORS SHALL BE MATCH TO TABLE 9-1 WASTEWATER COLUMN.
   - 2.7. THE EMERGENCY STOP SYSTEM MUST BE DESIGNED TO MEET THE CITY OF WINNIPEG ELECTRICAL DESIGN GUIDE SECTION 7.10 EMERGENCY STOP SYSTEMS REQUIREMENT.
   - 2.8. EACH MCC PUMP CELL SHALL INCLUDE THE FOLLOWING PILOT DEVICES ON THE DOOR:
     - 2.8.1. "PUMP RUN" PILOT LIGHT IN GREEN.
     - 2.8.2. "PUMP READY" PILOT LIGHT IN BLUE.
     - 2.8.3. "PUMP FAULT" PILOT LIGHT IN RED.
     - 2.8.4. "MCC E-STOP LOCKOUT" PILOT LIGHT IN RED.
     - 2.8.5. "SOFT START RESET" PUSH BUTTON.
     - 2.8.6. "HOA" SELECTOR SWITCH.
     - 2.8.7. "START" PUSH BUTTON.
     - 2.8.8. "STOP" PUSH BUTTON.
     - 2.8.9. "E-STOP" MUSHROOM HEAD PUSH BUTTON.
     - 2.8.10. "E-RESET" PUSH BUTTON.
     - 2.8.11. ELAPSE TIME METER.
     - 2.8.12. SOFT STARTER CONTROL KEYPAD.
   - 2.9. EACH MCC PUMP CELL SHALL PROVIDE THE FOLLOWING CONTACTS AND PRE-WIRE TO TERMINATION BLOCKS FOR FIELD WIRING.
     - 2.9.1. SOFT STARTER LINE SIDE ISOLATION CONTACTOR (3 X N.O. + 1 X N.C.)
     - 2.9.2. AUTO MODE
     - 2.9.3. HAND MODE
     - 2.9.4. PUMP READY
     - 2.9.5. RUMP RUN
     - 2.9.6. PUMP FAULT
     - 2.9.7. CONTROL POWER
     - 2.9.8. E-STOP
     - 2.9.9. REMOTE AUTO RUN (24VDC, RELAY)
     - 2.9.10. SOFT START FAULT
   - 2.10. THE LENGTH OF MCC MUST BE LESS THAN 2160 mm.
   - 2.11. POWER METER SHALL BE ENHANCED TYPE SHOWN ON THE ELECTRICAL DESIGN GUIDE SECTION 9.2.
   - 2.12. THE MCC SHALL BE SCHNEIDER ELECTRIC OR APPROVED EQUIVALENT.

3. TRANSFORMER
   - 3.1. SUPPLY AND INSTALL A 75KVA 600V-120/208V 3Ø 4W DRY TYPE TRANSFORMER AS SHOWN ON DRAWING.

4. PANELBOARD
   - 4.1. SUPPLY AND INSTALL A 225A 208/120V 3Ø 4W PANELBOARD WITH MAIN LUGS.
   - 4.2. WIRE ALL EQUIPMENT SHOWN ON THE PANEL SCHEDULE TO THE PANELBOARD.
   - 4.3. ALL BREAKERS SHALL BE BOLT-ON TYPE.
   - 4.4. PANELBOARD SHALL BE SURFACE MOUNTED ON PAINTED PLYWOOD BACKBOARD AND UNISTRUT STYLE MOUNTING CHANNELS.
   - 4.5. PROVIDE 20% SPARE 15A BREAKERS (OR 5 BREAKERS, WHICHEVER IS LESS)

5. LIGHT FIXTURES AND UPS
   - 5.1. SUPPLY AND INSTALL LIGHT FIXTURES FOR THE MAIN FLOOR AND INSIDE THE DRY WELL AS SHOWN ON THE LIGHT FIXTURE SCHEDULE AND ON THE DRAWING.
   - 5.2. ALL LIGHT FIXTURES INSIDE THE DRY WELL AND FOR THE DRY WELL STAIR MUST BE RATED FOR HAZARDOUS LOCATION.
   - 5.3. SUPPLY AND INSTALL A UPS TO POWER UP ALL LIGHT FIXTURES. THE UPS SHALL BE AMLITE EBST-MVP121000CCWHTON/ATD 1000W NORMALLY ON MINI INVERTER WITH AUTO-TEST-SELF-DIAGONSTIC FEATURE.

6. PLC CONTROL PANEL
   - 6.1. ALL PLC CONTROL MUST COMPLY WITH THE CITY OF WINNIPEG AUTOMATION DESIGN GUIDE REQUIREMENT.
   - 6.2. THE HMI LAYOUT MUST COMPLY WITH THE CITY OF WINNIPEG HMI LAYOUT AND ANIMATION PLAN.
   - 6.3. OTHER THAN THE POWER SUPPLY VOLTAGE TO THE PLC CONTROL PANEL, NO OTHER VOLTAGE SHALL BE HIGHER THAN 24V.
   - 6.4. SUPPLY AND INSTALL A PLC CONTROL PANEL AS SHOWN ON DRAWING.
   - 6.5. THE PLC CONTROL PANEL MUST INCLUDE A BACKUP UPS.
   - 6.6. THE PLC SHALL MUST BE SCHNEIDER M580 PLC.
   - 6.7. THE PLC SHALL INCLUDES TWO NOR CARDS FOR COMMUNICATION. THE CITY OF WINNIPEG WILL SUPPLY A CELLULAR MODEM FOR ONE OF THE NOR CARD CONNECTION. THE PLC CONTROL PANEL SHALL PROVIDE SPACE FOR THE CELL MODEM INSTALLATION. THE PLC CONTROL PANEL SHALL INCLUDE ANOTHER DIAL UP MODEM FOR THE SECOND NOR CARD AND THE EXISTING PHONE LINE CONNECTION. THE CELL MODEM IS THE PRIMARY COMMUNICATION METHOD TO THE CITY'S SCADA SYSTEM AND THE DIAL UP MODEM IS A BACK UP WHEN THE PRIMARY NOR CARD OR THE CELL MODEM FAIL.
   - 6.8. THE PLC SHALL INCLUDE ALL DISCRETE AND ANALOG I/O MODULES AS REQUIRED.
   - 6.9. PROVIDE MINIMUM 20% SPARE I/O CAPACITY FOR ALL DISCRETE AND ANALOG INPUT/OUTPUT TYPES.
   - 6.10. CONNECT ALL AVAILABLE NETWORK AND COMMUNICATION WIRES REQUIRED FROM OTHER EQUIPMENT TO THE PLC.

7. SMOKE DETECTORS
   - 7.1. SUPPLY AND INSTALL A SMOKE DETECTOR FOR THE MAIN FLOOR AND A DUCT SMOKE DETECTOR INSIDE THE DRY WELL RETURN AIR DUCT. THE DUCT SMOKE DETECTOR SHALL BE GREENHECK D4120 OR APPROVED EQUIVALENT.
   - 7.2. COORDINATE WITH MECHANICAL TRADE.

8. FLOOD SENSOR
   - 8.1. SUPPLY AND INSTALL A FLOOD SENSOR AT THE BOTTOM OF THE DRY WELL.
   - 8.2. THE FLOOD SENSOR SHALL BE SIEMENS SITRANS LVL200 OR APPROVED EQUIVALENT.

9. RECEPTACLES
   - 9.1. SUPPLY AND INSTALL AN EXPLOSION PROOF PLUG AND RECEPTACLE AT 1000mm ABOVE THE BOTTOM OF THE DRY WELL FOR DEHUMIDIFIER.
   - 9.2. SUPPLY AND INSTALL AN EXPLOSION PROOF PLUG AND RECEPTACLE AT 1000mm ABOVE THE BOTTOM OF THE DRY WELL FOR THE SUMP PUMP.
   - 9.3. THE TWO RECEPTACLES INSTALLED INSIDE THE DRY WELL SHALL BE WALL MOUNTED WITH METAL BOX AND 30° ANGLE. THE RECEPTACLES AND PLUGS SHALL BE MELTRIC OR APPROVED EQUIVALENT.
   - 9.4. THE TWO RECEPTACLES INSIDE THE DRY WELL SHALL BE INSTALLED CLOSE TO THE SUMP PUMP AND THE PORTABLE DEHUMIDIFIER. COORDINATE WITH THE CITY OF WINNIPEG FOR THE FINAL LOCATION OF THE DRY WELL RECEPTACLES.
   - 9.5. SUPPLY AND INSTALL INDUSTRIAL GRADE RECEPTACLES ON THE MAIN FLOOR AS SHOWN ON DRAWING.
   - 9.6. EXTERIOR RECEPTACLE SHALL BE WEATHER PROOF GFCI TYPE.
   - 9.7. ALL RECEPTACLES TO BE PROVIDED WITH A DUAL, SPRING-LOADED SELF-CLOSING WEATHERPROOF GASKETED COVER PLATE.

10. LIGHT SWITCH
    - 10.1. THE LIGHT SWITCH SHALL INCLUDE A DRY CONTACT TO PROVIDE OCCUPIED/UNOCCUPIED SIGNAL TO THE PLC.

11. DOOR SWITCH
    - 11.1. SUPPLY AND INSTALL A DOOR SWITCH AT THE ENTRANCE DOOR. THE PLC SHALL MONITOR THE DOOR OPEN/CLOSE SIGNALS FOR HVAC CONTROL.

12. LOW VOLTAGE MONITORING PANEL
    - 12.1. SUPPLY AND INSTALL A PANEL INCLUDING AN ABB VOLTAGE MONITORING RELAY FOR 208V 3Ø VOLTAGE MONITORING. WIRE THE ALARM CONTACT TO THE PLC.

13. FLOOD PUMPS
    - 13.1. SUPPLY AND INSTALL NEW POWER CABLE FOR THE FLOOD PUMPS

14. SUMP PUMP
    - 14.1. REPLACE THE EXISTING SUMP PUMP WITH A NEW EXPLOSION PROOF SUMP PUMP AT THE BOTTOM OF THE DRY WELL.

15. ULTRASONIC LEVEL SENSOR
    - 15.1. SUPPLY AND INSTALL AN EXPLOSION PROOF ULTRASONIC SENSOR INCLUDING SUPPORT STRUCTURE INSIDE THE WET WELL.
    - 15.2. ULTRASONIC LEVEL SENSOR SHALL BE SIEMENS SITRANS ECHOMAX XPS WITH MULTIRANGER 100/200 24VDC VERSION CONTROLLER OR APPROVED EQUIVALENT.
    - 15.3. THE CONTRACTOR MUST INSTALL THE SENSOR TO THE LOCATION IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. THE SENSOR MUST BE ACCESSIBLE FOR MAINTENANCE.
    - 15.4. THE CONTRACTOR MUST CALIBRATE THE ULTRASONIC LEVEL SENSOR TO CONFIRM THE MEASUREMENT IS CORRECT.

16. 208V VOLTAGE MONITORING PANEL (CP-F71)
    - 16.1. SUPPLY AND INSTALL A 208V VOLTAGE MONITORING RELAY INSIDE THE VOLTAGE MONITORING PANEL (CP-F71) TO MONITORING THE 208V VOLTAGE FAULT. THE VOLTAGE MONITORING RELAY SHALL BE ABB WVM611AL 208V OR APPROVED EQUIVALENT.

17. WIRE AND CABLE
    - 17.1. ALL CONDUCTORS SHALL HAVE 600 VOLT RATED INSULATION UNLESS OTHERWISE STATED AND RATED 90 DEGREE CELSIUS UNLESS OTHERWISE NOTED. ALL CONDUCTORS ARE COPPER.
    - 17.2. DISTRIBUTION AND BRANCH CIRCUIT CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED, #10 AND SMALLER SHALL BE SOLID.
    - 17.3. THE MINIMUM WIRE SIZE FOR BRANCH CIRCUITS SHALL BE #12 AWG. LAYOUT OF BRANCH CIRCUIT WIRING AND ARRANGEMENT OF HOME RUNS SHALL BE FOR MAXIMUM ECONOMY AND EFFICIENCY.
    - 17.4. FACTORY COLOR CODING SHALL CONFORM TO THE BUILDING STANDARD OR AS REQUIRED BY THE UTILITY COMPANY.
    - 17.5. IDENTIFY ALL FEEDERS IN ALL PULL BOXES AND IN ALL GUTTER SPACE AND WIREWAYS THROUGH WHICH THEY PASS.
    - 17.6. MAKE SPLICE IN FEEDERS WITH CSA APPROVED JUNCTION BOX.
    - 17.7. SPLICES IN CIRCUITS SHALL BE TWISTED AND MADE MECHANICALLY TIGHT. SECURE WITH SCOTCHLOCK OR PIGTAIL CONNECTORS. CRIMP TYPE CONNECTORS SHALL NOT BE USED.
    - 17.8. ELECTRICAL SUBCONTRACTOR TO BAND AND LABEL CONDUIT AS PER OWNER REQUIREMENT.

18. PULL BOXES, JUNCTION BOXES AND OUTLET BOXES
    - 18.1. PULL BOXES, JUNCTION BOXES AND OUTLET BOXES SHALL BE MANUFACTURED FROM GALVANIZED INDUSTRY STANDARD GAUGE SHEET STEEL. NEMA RATED FOR ENVIRONMENT AND CSA APPROVED FOR THE USE.
    - 18.2. SUPPLY AND INSTALL PULL BOXES AND JUNCTION BOXES IN RACEWAYS TO ASSURE THAT CABLES ARE NOT DAMAGED WHEN THEY ARE PULLED AND SELECTED PER MINIMUM CODE REQUIREMENTS.
    - 18.3. PULL BOXES AND JUNCTION BOXES SHALL BE SIZED SO THAT THE MINIMUM BENDING RADIUS CRITERIA SPECIFIED FOR THE WIRES AND CABLE ARE MAINTAINED AS.
    - 18.4. PROVIDE AND INSTALL ALL REQUIRED JUNCTION AND PULL BOXES REGARDLESS WHETHER INDICATED ON DRAWINGS OR NOT.
    - 18.5. ALL BOXES WILL BE IDENTIFIED WITH A LAMACOID INDICATING VOLTAGE AND SOURCE IE. SWITCH, CIRCUIT BREAKER C/W PANEL MCC AND CELL.

19. CONDUITS
    - 19.1. ALL CONDUITS INSIDE THE WET WELL AND DRY WELL SHALL BE RIGID ALUMINUM.
    - 19.2. ALL CONDUITS ON MAIN FLOOR WHERE PRONE TO POTENTIAL MECHANICAL DAMAGE OR ACCEPTABLE SUPPORT SPANS EXCEED PVC CAPABILITIES SHALL BE RIGID ALUMINUM OTHERWISE PVC WILL BE ACCEPTABLE.

20. WATER SEAL SOLENOID AND PRESSURE SWITCH
    - 20.1. PROVIDE CONTROL POWER TO THE WATER SEAL SOLENOID AND PRESSURE SWITCH FOR EACH PUMP.

21. LAMACOIDS
    - 21.1. SUPPLY AND INSTALL LAMACOID AS PER THE CITY OF WINNIPEG ELECTRICAL DESIGN GUIDE AND THE IDENTIFICATION GUIDE REQUIREMENT.

22. GROUNDING
    - 22.1. CONNECT THE EXISTING BUILDING GROUND GRID TO THE MCC.

23. SEALING
    - 23.1. ALL OPENINGS BETWEEN THE WET WELL AND THE MAIN FLOOR FOR CONDUITS AND CABLES SHALL BE SEALED.
    - 23.2. ALL OPENINGS BETWEEN THE DRY WELL LAND THE MAIN FLOOR FOR CONDUITS AND CABLES SHALL BE SEALED.
    - 23.1. ALL CONDUITS AND CABLES EXIT FROM THE WET WELL AND DRY WELL ENTERING INTO THE MAIN FLOOR SHALL BE SEALED IN ACCORDANCE WITH THE CSA 22.1 REQUIREMENT.
    - 23.2. THE ACCEPTABLE SEALANTS INCLUDE 3M, POLYWATER OR APPROVED EQUIVALENT.

24. HEATING/CIRCULATION SYSTEM CONTROL PANEL (HCCP-F60)
    - 24.1. SUPPLY AND INSTALL A HEATING/CIRCULATION SYSTEM CONTROL PANEL AS PER HVAC P&ID.
    - 24.2. THE ENCLOSURE SHALL BE NEMA 12 OR HIGHER RATED.
    - 24.3. THE CONTROL PANEL SHALL INCLUDE ALL THE PILOT DEVICES, ASSOCIATED HVAC CONTROL AND MISCELLANEOUS EQUIPMENT.

25. EXHAUST/COOLING SYSTEM CONTROL PANEL (ECCP-F61)
    - 25.1. SUPPLY AND INSTALL AN EXHAUST/COOLING SYSTEM CONTROL PANEL AS PER HVAC P&ID.
    - 25.2. THE ENCLOSURE SHALL BE NEMA 12 OR HIGHER RATED.
    - 25.3. THE CONTROL PANEL SHALL INCLUDE ALL THE PILOT DEVICES, ASSOCIATED HVAC CONTROL AND MISCELLANEOUS EQUIPMENT.

26. MECHANICAL EQUIPMENT
    - 26.1. ALL CONTROL WIRING ASSOCIATED WITH MECHANICAL EQUIPMENT IS THE RESPONSIBILITY OF THE ELECTRICAL SUBCONTRACTOR UNLESS NOTED OTHERWISE. THE ELECTRICAL SUBCONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING ALL LINE VOLTAGE POWER, CONDUIT AND OUTLET BOXES RELATED TO HVAC CONTROLS. COORDINATE ALL WORK WITH THE MECHANICAL CONTRACTOR.
    - 26.2. COORDINATE WITH MECHANICAL AND PLUMBING SUBCONTRACTORS FOR THE ELECTRICAL REQUIREMENTS OF ALL MECHANICAL EQUIPMENT TO BE INSTALLED. DO NOT RUN CONDUIT AND CONDUCTORS PRIOR TO THE CONFIRMATION OF THE EQUIPMENT REQUIREMENTS.

27. ARC FLASH STUDY
    - 27.1. PERFORM ARC FLASH AND COORDINATION STUDIES USING THE POWER*TOOLS SOFTWARE BY SKM SYSTEM ANALYSIS, INC. AS PER THE CITY OF WINNIPEG ELECTRICAL DESIGN GUIDE, IEEE 1584 AND CSA-Z462-18 WORKPLACE ELECTRICAL SAFETY STANDARDS AND REQUIREMENTS.
    - 27.2. PROVIDE ARC FLASH LABELS FOR ELECTRICAL EQUIPMENT.
    - 27.3. PROVIDE ARC FLASH AND COORDINATION STUDY REPORT TO THE CONTRACT ADMINISTRATOR FOR REVIEW.
    - 27.4. PROVIDE 5 HARD COPIES OF ARC FLASH AND COORDINATION STUDY REPORTS TO THE CITY OF WINNIPEG.

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
Tetra Tech Canada Inc.
No. 6499

LOCATION APPROVED
UNDERGROUND STRUCTURES

SUPR, UG STRUCTURES COMMITTEE _____ DATE _____

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

B.M. ELEV. F.B.

NO.	REVISIONS	DATE	BY
00	ISSUED FOR TENDER	18.08.02	TL

TETRA TECH

DESIGNED BY TL	CHECKED BY HSL
DRAWN BY CPG	APPROVED BY
HOR. SCALE: AS NOTED VERTICAL:	RELEASED FOR CONSTRUCTION
DATE	DATE

PROVINCE OF MANITOBA
2018.08.02
H.S. LEUNG
Member
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING NO.
1800120700-DWG-E0006

Winnipeg
THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

BALTIMORE FLOOD PUMPING STATION UPGRADES

ELECTRICAL SPECIFICATION SHEET 1 OF 2

CITY DRAWING NUMBER
SHEET 18 OF 23
E0006