ELECTRICAL SYMBOLS

SYMBOL	EXPLANATION
T	THERMOSTAT OUTLET
P	PHOTOCELL
S_{DS}	DOOR ACCESS CONTROL DOOR STRIKE
DS	DOOR ACCESS CONTROL DOOR SENSOR
^{a,b,c}	CONTROL SWITCH (LETTERS INDICATES CONTROL OF CORRESPONDING FIXTURES CONTROLLED)
$	SWITCH (SUBSCRIPT AS INDICATED BELOW)
2	TWO POLE OR TWO RELAY SWITCH
3	3-WAY SWITCH
D	DIMMER SWITCH
T	TIME SWITCH
M	MANUAL STARTER WITH THERMAL OVERLOAD
F	PADDLE FAN SPEED CONTROL. (CANARM "CN" SERIES)
OC	OCCUPANCY SENSOR SWITCH
F1	FIXTURE TYPE SYMBOL
	WALL PACK
	STRIP
	EMERGENCY LIGHTING UNIT
	BRANCH CIRCUIT CONCEALED IN CEILING OR WALL
	BRANCH CIRCUIT CONCEALED IN GROUND OR FLOOR
A-1,3	BRANCH CIRCUIT HOMERUNS TO PANEL
	LIGHTING AND POWER PANELBOARD
NON-FUSED / FUSED	DISCONNECT SWITCH
VFD	VARIABLE FREQUENCY DRIVE
C	CONDUIT STUB
J	JUNCTION BOX
	DUPLEX RECEPTACLE OUTLET (+44" — MODIFIER; A-3 — PANEL SPACE ASSIGNMENT; WP — MODIFIER)
WP	WEATHERPROOF COVER & LISTED WEATHER RESISTANT DEVICE
GFCI	PROTECTED BY FAULT CIRCUIT INTERRUPTER
+44	MOUNTING HEIGHT ABOVE FLOOR OR GRADE IN INCHES

NOTE: ALL SYMBOLS MAY NOT BE USED.

ELECTRICAL GENERAL NOTES:

1. WHERE REFERENCED, POWER UTILITY IS ROCKY MOUNTAIN POWER. COORDINATE WITH JUAN GOMEZ WRN 8825985.
2. REVIEW AND COORDINATE WITH ARCHITECTURAL, CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, AND OTHER DRAWINGS PRIOR TO BID.
3. NOTIFY AND COOPERATE WITH THE MECHANICAL CONTRACTOR SUCH THAT NO DUCTS, PIPING, OR EQUIPMENT FOREIGN TO THE OPERATION OF THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE INSTALLED IN, ENTER, OR PASS THROUGH ELECTRICAL ROOMS OR SPACES, OR ABOVE OR BELOW ELECTRICAL EQUIPMENT IN OTHER AREAS.
4. VERIFY EXACT LOCATION(S) OF ALL EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
5. PERFORM ALL WORK IN A WORKMANLIKE MANNER, PER INDUSTRY STANDARD, AND TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE AND NATIONAL CODES, STANDARDS AND ORDINANCES.
6. FINAL CONNECTIONS TO EQUIPMENT SHALL BE MADE AS PER MANUFACTURERS WRITTEN INSTRUCTIONS AND APPROVED WIRING DIAGRAMS AND DETAILS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PROVIDE ALL MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED. THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL ELECTRICAL LOADS (VOLTAGE, PHASE, CONNECTION REQUIREMENTS, ETC,) OF EQUIPMENT FURNISHED UNDER OTHER DIVISIONS WITH APPROVED SHOP DRAWINGS PRIOR TO BEGINNING ROUGH-IN.
7. ALL MATERIALS USED IN THIS INSTALLATION SHALL BE U.L. APPROVED AND NEW.
8. VISIT THE PROJECT SITE DURING THE BIDDING PROCESS TO DETERMINE THE TOTAL SCOPE OF THE PROJECT.
9. DO NOT PENETRATE STRUCTURAL ELEMENTS OF FLOORS, WALLS, CEILINGS, ROOF, ETC.

Sheet List Table

Date: 11/14/22
Scale:

Revisions

Date	Description

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(801) 597-1580 PROJECT PE222

REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH
9857303-2202
KYLE L BREINHOLT
6 January 2023

ELECTRICAL COVER SHEET
WCWSID – EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
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E01
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ELECTRICAL SPECIFICATIONS

GENERAL PROVISION

A. REFERENCE
   1. THE GENERAL CONDITIONS AND OTHER CONTRACT DRAWINGS AS SET FORTH IN THE FOREGOING PAGES ARE HEREBY INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR WORK UNDER THIS TITLE, INSOFAR AS THEY APPLY HERETO.
   2. ALL SPECIFICATIONS UNDER THIS DIVISION TITLE ARE DIRECTED TO AND ARE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR, UNLESS OTHER TRADES OR PERSONS ARE SPECIFICALLY MENTIONED, 'ELECTRICAL CONTRACTOR' IS INFERRED AND INTENDED.

B. CONTRACT DRAWINGS
   1. THE DRAWINGS ACCOMPANYING THESE SPECIFICATIONS ARE COMPLEMENTARY EACH TO THE OTHER AND WHAT IS CALLED FOR BY ONE SHALL BE AS IF CALLED FOR BY BOTH.
   2. CONSULT ALL CONTRACT DRAWINGS WHICH MAY AFFECT THE LOCATION OF EQUIPMENT, CONDUIT AND WIRING AND MAKE MINOR ADJUSTMENTS IN LOCATION TO SECURE COORDINATION.
   3. WIRING LAYOUT IS SCHEMATIC AND EXACT LOCATIONS SHALL BE DETERMINED BY FIELD CONDITIONS.
   4. OTHER THAN MINOR ADJUSTMENTS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING WITH THE WORK.

C. JOB-SITE COPY OF DOCUMENTS
   1. MAINTAIN AT THE SITE, ONE COPY OF ALL DRAWINGS, SPECIFICATIONS, ADDENDA APPROVED SHOP DRAWINGS, CHANGE ORDERS AND OTHER MODIFICATIONS, IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION. THESE SHALL BE AVAILABLE TO THE OWNER'S REPRESENTATIVE. THE DRAWINGS MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION SHALL BE DELIVERED TO THE OWNER'S REPRESENTATIVE FOR THE OWNER UPON COMPLETION OF THE WORK. AN ADDITIONAL SET OF DRAWINGS WILL BE FURNISHED BY THE OWNER'S REPRESENTATIVE FOR THIS PURPOSE UPON REQUEST.

D. MANUFACTURER'S DRAWINGS
   1. THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR REVIEW. (6) COPIES OF MANUFACTURER'S DRAWINGS AND WIRING DIAGRAMS. THE ENGINEER WILL REVIEW CONTRACTOR'S SHOP DRAWINGS AND RELATED SUBMITTALS (AS INDICATED BELOW) WITH RESPECT TO THE ABILITY OF THE DETAILED WORK, WHEN COMPLETE, TO BE A PROPERLY FUNCTIONING INTEGRAL ELEMENT OF THE OVERALL SYSTEM DESIGNED BY THE ENGINEER. BEFORE SUBMITTING A SHOP DRAWING OR ANY RELATED MATERIAL TO THE ENGINEER, CONTRACTOR SHALL: REVIEW EACH SUCH SUBMISSION FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF CONTRACTOR: APPROVE EACH SUCH SUBMISSION BEFORE SUBMITTING IT; AND SO STAMP EACH SUCH SUBMISSION BEFORE SUBMITTING IT. THE ENGINEER SHALL ASSUME THAT NO SHOP DRAWING OR RELATED SUBMITTAL COMPRISES A VARIATION UNLESS CONTRACTOR ADVISES ENGINEER OTHERWISE VIA A WRITTEN INSTRUMENT WHICH IS ACKNOWLEDGED BY ENGINEER IN WRITING. THE ITEMS, TYPES OF SUBMITTALS AND RELATED MATERIAL (IF ANY) CALLED FOR ARE INDICATED BELOW:

ITEMS	TYPE SUBMITTALS REQUESTED
LIGHTING AND POWER PANELS	SHOP DRAWINGS
LIGHTING FIXTURES	CATALOG CUTS

E. GUARANTEES
   1. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEFECTS, REPAIRS AND REPLACEMENTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR AFTER DATE OF SUBSTANTIAL COMPLETION AS DETERMINED BY THE OWNER'S REPRESENTATIVE. PRODUCT GUARANTEES GREATER THAN ONE (1) YEAR SHALL BE PASSED ALONG TO THE OWNER FOR FULL BENEFIT OF THE MANUFACTURER'S WARRANTY.

WORK INCLUDED

A. INSTALLATION, MATERIALS, AND WORKMANSHIP
   1. FURNISH AND INSTALL ALL NECESSARY ANCHORS, SUPPORTS, STRAPS, BOXES, FITTINGS AND OTHER SIMILAR APPURTENANCES NOT INDICATED ON THE DRAWINGS BUT WHICH ARE REQUIRED FOR A COMPLETE AND PROPERLY INSTALLED SYSTEM CONSISTENT WITH THE ARCHITECTURAL TREATMENT OF THE BUILDING.
   2. THE ELECTRICAL CONTRACTOR, INSOFAR AS THE WORK IS CONCERNED, SHALL AT ALL TIMES KEEP THE PREMISES IN A NEAT AND ORDERLY CONDITION. AND AT THE COMPLETION OF THE WORK, SHALL PROPERLY CLEAN UP AND CART AWAY DEBRIS AND EXCESS MATERIALS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF DUMPSTER & REFUSED DISPOSAL AS REQUIRED FOR ELECTRICAL WORK.
   3. ALL MATERIALS SHALL BE NEW AND UNDETERIORATED AND OF A QUALITY NOT LESS THAN THE MINIMUM SPECIFIED.

B. COORDINATION OF PLANS AND SPECIFICATIONS
   1. CONTACT THE OWNER'S REPRESENTATIVE IMMEDIATELY IF THERE IS ANY QUESTIONS REGARDING THE MEANING OR INTENT OF EITHER PLANS OR SPECIFICATIONS, OR UPON NOTICING ANY DISCREPANCIES OR OMISSIONS IN EITHER PLANS OR SPECIFICATIONS.

C. CUTTING AND PATCHING
   1. ALL ELECTRICAL EQUIPMENT SHALL BE KEPT DRY AND CLEAN DURING THE CONSTRUCTION PERIOD. INTERIOR OF ALL ENCLOSURES SHALL BE CLEANED OF DIRT AND DEBRIS BEFORE INSTALLING TRIM OR COVERS.
   2. ALL FINISHED SURFACES OF EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE THOROUGHLY CLEANED OF DIRT AND ALL SCRATCHED OR DAMAGED SURFACES SHALL BE TOUCHED UP WITH MATCHING MATERIALS BEFORE FINAL ACCEPTANCE OF THE WORK.
   3. WHEN ALL WORK IS COMPLETED AND ALL WORK HAS BEEN SATISFACTORILY TESTED AND ACCEPTED BY THE OWNER'S REPRESENTATIVE, ALL CONDUIT AND OTHER EXPOSED SURFACES SHALL BE THOROUGHLY CLEANED.

CODES AND FEES

A. CODES:
   1. ALL WORK PERFORMED UNDER THIS SPECIFICATION SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AS PREPARED AND PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION AND ANY APPLICABLE STATE OR LOCAL CODES.

B. FEES:
   1. OBTAIN AND PAY FOR ANY AND ALL PERMITS REQUIRED BY ALL LAWS AND REGULATIONS AND PUBLIC AUTHORITY HAVING SUCH JURISDICTION.

TESTS AND INSPECTIONS

A. OBTAIN ALL INSPECTIONS REQUIRED BY ALL LAWS, ORDINANCES, RULES, REGULATIONS OR PUBLIC AUTHORITY HAVING JURISDICTION AND OBTAIN CERTIFICATES OF SUCH INSPECTIONS AND SUBMIT SAME TO THE OWNER'S REPRESENTATIVE. PAY ALL FEES, CHARGES AND OTHER EXPENSES IN CONNECTION THEREIN. OBTAIN OCCUPANCY PERMIT AS REQUIRED BY OWNER. FINAL PAYMENT SHALL NOT BE MADE UNTIL OCCUPANCY PERMIT IS OBTAINED.

B. WORK SHALL BE UNACCEPTABLE WHEN FOUND TO BE DEFECTIVE OR CONTRARY TO THE PLANS SPECIFICATIONS, CODES SPECIFIED OR ACCEPTED STANDARDS OF GOOD WORKMANSHIP.

C. THE CONTRACTOR SHALL PROMPTLY CORRECT ALL WORK FOUND UNACCEPTABLE BY THE OWNER'S REPRESENTATIVE WHETHER OBSERVED BEFORE OR AFTER SUBSTANTIAL COMPLETION AND WHETHER OR NOT FABRICATED, INSTALLED OR COMPLETED. THE CONTRACTOR SHALL BEAR ALL COSTS OF CORRECTING SUCH UNACCEPTABLE WORK, INCLUDING COMPENSATION FOR THE OWNERS REPRESENTATIVE ADDITIONAL SERVICES MADE NECESSARY THEREBY.

CONDUIT

A. FURNISH AND INSTALL ALL CONDUITS, BOXES, FITTINGS, ETC., FOR A COMPLETE RACEWAY SYSTEM.
B. ALL WIRING SHALL BE RUN IN EMT CONDUIT OR MC CABLE WITH GROUND CONDUCTOR UNLESS OTHERWISE NOTED.
C. ALL CONDUIT SIZES STATED HEREIN OR MARKED ON THE DRAWINGS ARE MINIMUM SIZE AND SHALL BE NO LESS THAN ½" UNLESS OTHERWISE NOTED.
D. ALL CONDUIT SHALL BE SUBSTANTIALLY SUPPORTED BY PIPE STRAPS OR SUITABLE CLAMPS OR HANGERS ATTACHED TO THE ELEMENTS OF THE BUILDING STRUCTURE TO PROVIDE RIGID INSTALLATION; IN NO CASE SHALL CONDUIT BE ATTACHED OR SUPPORTED FROM ADJOINING PIPE OR INSTALLED IN SUCH A MANNER AS TO PREVENT THE READY REMOVAL OF OTHER PIPE FOR REPAIRS.

WIRE AND CABLE

A. ALL CONDUCTORS SHALL BE COPPER AND OF THE AWG SIZE AND TYPE SHOWN ON THE DRAWINGS. WHERE NO SIZE OR TYPE IS SHOWN. CONDUCTORS SHALL NOT BE LESS THAN #12 TYPE XHHW, THHN, OR THWN. CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED COPPER AND HAVE 600 VOLT INSULATION; BE UL LABELED AND OF AMERICAN MANUFACTURER.
B. ALL BRANCH CIRCUITS IN PATIENT CARE AREAS SHALL BE MEDICAL GRADE MC CABLE.
C. ALL BRANCH CIRCUITS IN OFFICE AND COMMON AREAS SHALL BE TYPE NM OR MC CABLE.
D. ALL CONNECTIONS ARE TO BE MADE USING PRESSURE TYPE TERMINALS.
E. THE FOLLOWING COLOR CODE SHALL BE USED:

	120/240 VOLT	120/208 VOLT	277/480 VOLT
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	WHITE
GROUND	GREEN	GREEN	GREEN

F. CONDUCTORS NO. 10 AWG OR SMALLER SHALL HAVE INSULATION COLORED AS NOTED ABOVE.
G. CONDUCTORS NO. 8 AWG OR LARGER SHALL HAVE INSULATION COLORED AS NOTED ABOVE OR COLORED TAPE, MINIMUM SIZE ½", WRAPPED TWICE AROUND AT THE FOLLOWING POINTS:
   1. AT EACH TERMINAL
   2. AT EACH CONDUIT ENTRANCE
   3. AT INTERVALS NOT MORE THAN 12 INCHES APART IN ALL BOXES, PANEL TUBS, SWITCHBOARDS, ETC
G. ALL BRANCH CIRCUITS SHALL BE MARKED IN THE PANEL BOARD GUTTERS. MARKERS SHALL INDICATE CORRESPONDING BRANCH---CIRCUIT NUMBERS.
H. EACH BRANCH CIRCUIT REQUIRING A NEUTRAL SHALL BE FURNISHED WITH A SEPARATE INDIVIDUAL NEUTRAL CONDUCTOR.

BOXES AND PLATES

A. FURNISH AND INSTALL ALL OUTLET, JUNCTION, AND PULL BOXES AS INDICATED ON THE DRAWINGS AND AS NECESSARY TO INSTALL THE REQUIRED CONDUIT AND WIRING IN A NEAT AND WORKMANLIKE MANNER.
B. PULL BOXES AND JUNCTION BOXES SHALL BE GALVANIZED AND OF THE CORRECT SIZE AND GAUGE, SIZED IN ACCORDANCE WITH CODE REQUIREMENTS AND SHALL BE U.L. LABELED.
C. BOXES AT EXTERIOR AREAS TO BE WATERTIGHT AND DUST-TIGHT WITH GASKETED COVERS.
D. ALL BOXES FOR EXPOSED WORK IN FINISHED SPACES SHALL BE "FS" TYPE WITH THREADED HUBS WITH RIGID CONDUIT RISER (DEEP WIRE MOLD BOXES)
E. ALL BOXES SHALL BE RIGIDLY SUPPORTED INDEPENDENT OF THE CONDUIT SYSTEM. BOXES CAST INTO MASONRY OR CONCRETE ARE CONSIDERED TO BE RIGIDLY SUPPORTED.
F. UNDERGROUND BOXES/ENCLOSURES:
   1. DESCRIPTION: IN-GROUND, OPEN BOTTOM BOXES FURNISHED WITH FLUSH, NON-SKID COVERS WITH LEGEND INDICATING TYPE OF SERVICE AND STAINLESS STEEL TAMPER RESISTANT COVER BOLTS.
   2. SIZE: AS INDICATED ON DRAWINGS.
   3. DEPTH: AS REQUIRED TO EXTEND BELOW FROST LINE TO PREVENT FROST UPHEAVAL, BUT NOT LESS THAN 12 INCHES.
   4. APPLICATIONS:
      a. SIDEWALKS AND LANDSCAPED AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 8 LOAD RATING.
      b. PARKING LOTS, IN AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 15 LOAD RATING.
      c. DO NOT USE POLYMER CONCRETE ENCLOSURES IN AREAS SUBJECT TO DELIBERATE VEHICULAR TRAFFIC.
G. COMPOSITE UNDERGROUND BOXES/CONCLOSURES: COMPLY WITH SCTE 77.

WIRING DEVICES

A. WIRING DEVICES SHALL BE SIMILAR TO THOSE LISTED BELOW AND OF SPECIFIED AMPERAGE. OTHER SPECIAL PURPOSE DEVICES SHALL BE AS SPECIFIED ON THE DRAWINGS.
B. DUPLEX GROUNDING TYPE RECEPTACLE---20 AMP, 125 VOLT---
   1. HUBBELL---5352
   2. ARROW HART---5352
C. SINGLE POLE SWITCHES - 20 AMP, 120 VOLT
D. WEATHERPROOF RECEPTACLES - 20 AMP, 125 VOLT---NEMA 5---20R
   1. HUBBELL---5352 WITH 5205 COVER INTERMATIC GUARDIAN
   2. I SERIES, NEMA 3R COVER
   3. ARROW HART---5352 WITH 4500 COVER
E. G.F.C.I. RECEPTACLE- 20 AMP, 125 VOLT---NEMA 5-20 R
   1. HUBBELL- GF 5262 WITH MATCHING NYLON COVER PLATE OR WO-26 W.P. COVER
F. GROUND ALL RECEPTACLES IN ACCORDANCE WITH ARTICLE 250-146 OF NEC AND AS INDICATED IN THE GROUNDING SECTION OF THIS SPECIFICATION.
G. PROVIDE TAMPER RESISTANT RECEPTACLES PER NEC 406.12.

IDENTIFICATION

A. EACH PIECE OF SERVICE EQUIPMENT AND INDIVIDUAL SWITCHES, ALL DISCONNECTS, STARTERS, ALL EXHAUST FAN MANUAL STARTING SWITCHES.
B. IDENTIFICATION SHALL BE IN THE FORM OF LAMINATED PLASTIC NAMEPLATES, BLACK RACE, WITH THE LETTERS ENGRAVED INTO THE WHITE BACKGROUND, MINIMUM ¼" HIGH. PLATES SHALL BE DRILLED ON EACH END FOR SHEET METAL SCREW ATTACHMENT. NO 'DYMO' OR SIMILAR TYPE LABELS WILL BE ALLOWED.
C. PANEL BOARD DIRECTORY: A TYPED CIRCUIT DIRECTORY SHALL BE PROVIDED INDICATING LOCAL AREA SERVED AND LOCATION FOR EACH BRANCH CIRCUIT.

GROUNDING

A. ALL FEEDERS AND BRANCH CIRCUITS OVER 100 VOLTS SHALL INCLUDE A GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250-122, EXCEPT NOT BE SMALLER THAN #12 FOR POWER AND LIGHTING CIRCUITS AND #14 FOR CONTROL CIRCUITS. ALL GROUND CONDUCTORS SHALL BE GREEN, OR AS SPECIFIED UNDER 'WIRE AND CABLE'.
B. ALL GROUND CLAMPS SHALL BE PENN-UNION 'GPL' TYPE OR SIMILAR BY O.Z. OR BURNDY.
C. CONDUIT FOR SOLITARY GROUND CONDUCTORS SHALL BE RIGID SCHEDULE 40 PVC NON- METALLIC ELECTRICAL CONDUIT WITH U.L. LABEL SOLITARY GROUND CONDUCTORS SHALL NOT BE PLACED THROUGH METALLIC SLEEVES OR CONDUITS AND SHALL NOT BE COMPLETELY ENCIRCLED BY METALLIC HANGERS OR SUPPORTS.
D. THE GROUND CONDUCTOR SHALL BE CONNECTED TO THE NEUTRAL IN ONLY TWO LOCATIONS -ON THE SUPPLY SIDE OF THE SERVICE DISCONNECT MEANS PER NEC---250---24 AND ON SEPARATELY DERIVED SYSTEMS PER NEC 250-30.
E. AT EACH RECEPTACLE BOX, THE GROUND CONDUCTOR SHALL ENTER AND CONNECT, WITH NORMAL WIRING CONNECTOR, TO: 1) THE GROUND PIGTAIL TO RECEPTACLE: 2) THE GROUND PIGTAIL TO THE BOX GROUND SCREW; AND 3) THE OUTGOING GROUND CONDUCTOR TO NEXT DEVICE, IF NOT AT END OF RUN. METAL TO METAL CONTACT BETWEEN THE DEVICE YOKE AND THE OUTLET BOX IS NOT ACCEPTABLE AS A BOND FOR EITHER SURFACE. MOUNTED BOXES OR FLUSH TYPE BOXES.
F. CONDUIT SYSTEM SHALL BE ELECTRICALLY CONTINUOUS. ALL LOCK NUTS SHALL CUT THROUGH ENAMELED OR PAINTED SURFACES ON ENCLOSURES. WHERE ENCLOSURES AND NON-CURRENT CARRYING METALS ARE ISOLATED FROM THE CONDUIT SYSTEM, USE BONDING JUMPERS WITH APPROVED CLAMPS. WHERE REDUCING WASHERS ARE USED AND WHERE CONCENTRIC OR ECCENTRIC KNOCKOUTS ARE NOT COMPLETELY REMOVED BONDING BUSHINGS SHALL BE REQUIRED.

POWER AND LIGHTING PANELS

A. FURNISH AND INSTALL, AS SCHEDULED AND SHOWN ON THE DRAWINGS, POWER PANELS FOR OPERATION ON VOLTAGES INDICATED.
B. ALL TERMINATIONS SHALL BE MARKED '75°C ONLY', '60/75° C' OR LISTED FOR USE OF 75° C INSULATED CONDUCTORS AT FULL 75° C AMPACITY.
C. ALL BUS BARS SHALL BE SILVER OR TIN PLATED COPPER.
D. CABINETS SHALL BE OF COMMERCIAL GALVANIZED SHEET STEEL, CODE GAUGE AND SIZE, SURFACE OR RECESSED MOUNTED AS CALLED FOR IN THE DRAWINGS.
E. NEUTRAL ASSEMBLY SHALL HAVE INDIVIDUAL ANTI-TURN SOLDERLESS TERMINALS, SIMILAR TO SQUARE D TYPE PK, FOR CONNECTION OF ULTIMATE NUMBER OF NEUTRAL WIRES. SHEET METAL TERMINAL STRIPS AND CONNECTIONS WILL BE REJECTED.
F. PANEL SHALL HAVE A COPPER GROUND BAR SIMILAR TO NEUTRAL BAR IN NUMBER, SIZE, AND TYPE OF ANTI-TURN SOLDERLESS LUGS. THIS GROUND BAR SHALL BE FACTORY BONDED TO THE PANEL TUB IN THE GUTTER SPACE OPPOSITE THE MAINS AND THE NEUTRAL ASSEMBLY AND SHALL HAVE THE SCREWDRIVER SLOTS FACING THE FRONT OF THE PANEL.
G. QUALITY STANDARD: SQUARE D TYPE NQOD

LIGHTING FIXTURES

A. CONTRACTOR SHALL FURNISH AND INSTALL LIGHTING FIXTURES AND LAMPS AS INDICATED IN FIXTURE SCHEDULE SHOWN ON DRAWINGS, AND SPECIFIED HEREIN.
B. NEUTRAL ASSEMBLY SHALL HAVE INDIVIDUAL ANTI-TURN SOLDERLESS TERMINALS, SIMILAR TO SQUARE D TYPE PK, FOR CONNECTION OF ULTIMATE NUMBER OF NEUTRAL WIRES. SHEET METAL TERMINAL STRIPS AND CONNECTIONS WILL BE REJECTED.
C. ALL LAMP HOLDERS INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE FURNISHED COMPLETE WITH NEW LAMPS OF THE SIZE INDICATING ON THE FIXTURE SCHEDULE.
D. LAMP CURRENT CREST FACTOR SHALL NOT EXCEED 1.8 AND SHALL BE COMPATIBLE WITH BALLAST BEING UTILIZED (PROGRAM START ELECTRONIC BALLAST SHALL BE USED).
E. ANY FIXTURES SCRATCHED, BENT, CRACKED OR IN ANY WAY DAMAGED BEFORE ACCEPTANCE BY OWNER SHALL BE REPLACED AT THIS CONTRACTOR'S EXPENSE.
F. ALL LAMPS SHALL BE IN WORKING ORDER AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER.
G. ALL LIGHTING FIXTURES ARE TO BE GROUNDED ON THE INTERIOR OF THE FIXTURE HOUSING, ON CLEAN BARE METAL (FREE OF PAINT). BY USE OF PIGTAIL AND FASTENED BY A SCREW USED FOR NO OTHER PURPOSE.
H. COMMISSIONING
   1. C408.3 LIGHTING SYSTEM FUNCTIONAL TESTING. CONTROLS FOR AUTOMATIC LIGHTING SYSTEMS SHALL COMPLY WITH SECTION C408.3.
   2. C408.3.1 FUNCTIONAL TESTING. TESTING SHALL ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. THE CONTRACTOR SHALL CONDUCT THE REQUIRED FUNCTIONAL TESTING. WHERE REQUIRED BY THE CODE OFFICIAL, AN APPROVED PARTY INDEPENDENT FROM THE DESIGN OR CONSTRUCTION OF THE PROJECT SHALL BE RESPONSIBLE FOR THE FUNCTIONAL TESTING AND SHALL PROVIDE DOCUMENTATION TO THE CODE OFFICIAL CERTIFYING THAT THE INSTALLED LIGHTING CONTROLS MEET THE PROVISIONS OF SECTION C405. WHERE OCCUPANT SENSORS, TIME SWITCHES, PROGRAMMABLE SCHEDULE CONTROLS, PHOTOSENSORS OR DAYLIGHTING CONTROLS ARE INSTALLED, THE FOLLOWING PROCEDURES SHALL BE PERFORMED:
      a. CONFIRM THAT THE PLACEMENT, SENSITIVITY AND TIME-OUT ADJUSTMENTS FOR OCCUPANT SENSORS YIELD ACCEPTABLE PERFORMANCE.
      b. CONFIRM THAT THE TIME SWITCHES AND PROGRAMMABLE SCHEDULE CONTROLS ARE PROGRAMMED TO TURN THE LIGHTS OFF.
      c. CONFIRM THAT THE PLACEMENT AND SENSITIVITY ADJUSTMENTS FOR PHOTOSENSOR CONTROLS REDUCE ELECTRIC LIGHT BASED ON THE AMOUNT OF USABLE DAYLIGHT IN THE SPACE AS SPECIFIED.

VARIABLE-FREQUENCY MOTOR CONTROLLERS

A. GENERAL
   1. SECTION INCLUDES
      a. VARIABLE FREQUENCY CONTROLLERS.
   2. SUBMITTALS
      a. PRODUCT DATA: PROVIDE CATALOG SHEETS SHOWING VOLTAGE, CONTROLLER SIZE, RATINGS AND SIZE OF SWITCHING AND OVERCURRENT PROTECTIVE DEVICES, SHORT CIRCUIT RATINGS, DIMENSIONS, AND ENCLOSURE DETAILS.
      b. SHOP DRAWINGS: INDICATE FRONT AND SIDE VIEWS OF ENCLOSURES WITH OVERALL DIMENSIONS AND WEIGHTS SHOWN; CONDUIT ENTRANCE LOCATIONS AND REQUIREMENTS; AND NAMEPLATE LEGENDS.
      c. OPERATION DATA: NEMA ICS 7.1. INCLUDE INSTRUCTIONS FOR STARTING AND OPERATING CONTROLLERS, AND DESCRIBE OPERATING LIMITS THAT MAY RESULT IN HAZARDOUS OR UNSAFE CONDITIONS.
   3. QUALITY ASSURANCE
      a. CONFORM TO REQUIREMENTS OF NFPA 70.

B. PRODUCTS
   1. MANUFACTURERS

Revisions

Date	Description

Date: 11/14/22
Scale:

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(801) 997-5380 PROJECT REVIEW

REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH
9857303-2202
KYLE L. BREINHOLT
8 January 2023

ELECTRICAL SPECIFICATIONS
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

GARDNER ENGINEERING
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E02

a. RELIANCE ELECTRIC/ROCKWELL AUTOMATION: WWW.RELIANCE.COM.
b. SIEMENS ENERGY & AUTOMATION: WWW.SEA.SIEMENS.COM.
c. SCHNEIDER ELECTRIC; SQUARE D PRODUCTS: WWW.SCHNEIDER-ELECTRIC.US.

2. DESCRIPTION
a. VARIABLE FREQUENCY CONTROLLERS: ENCLOSED CONTROLLERS SUITABLE FOR OPERATING THE INDICATED LOADS, IN CONFORMANCE WITH REQUIREMENTS OF NEMA ICS 7. SELECT UNSPECIFIED FEATURES AND OPTIONS IN ACCORDANCE WITH NEMA ICS 3.1.
1) EMPLOY MICROPROCESSOR-BASED INVERTER LOGIC ISOLATED FROM POWER CIRCUITS.
2) EMPLOY PULSE-WIDTH-MODULATED INVERTER SYSTEM.
3) DESIGN FOR ABILITY TO OPERATE CONTROLLER WITH MOTOR DISCONNECTED FROM OUTPUT.
4) DESIGN TO ATTEMPT FIVE AUTOMATIC RESTARTS FOLLOWING FAULT CONDITION BEFORE LOCKING OUT AND REQUIRING MANUAL RESTART.
b. ENCLOSURES: NEMA 250, TYPE 1, SUITABLE FOR EQUIPMENT APPLICATION IN PLACES REGULARLY OPEN TO THE PUBLIC.

3. OPERATING REQUIREMENTS
a. RATED INPUT VOLTAGE: 480 VOLTS, THREE PHASE, 60 HERTZ.
b. MOTOR NAMEPLATE VOLTAGE: 460 VOLTS, THREE PHASE, 60 HERTZ.
c. DISPLACEMENT POWER FACTOR: BETWEEN 1.0 AND 0.95, LAGGING, OVER ENTIRE RANGE OF OPERATING SPEED AND LOAD.
d. OPERATING AMBIENT: 0 DEGREES C TO 40 DEGREES C.
e. VOLTS PER HERTZ ADJUSTMENT: PLUS OR MINUS 10 PERCENT.
f. CURRENT LIMIT ADJUSTMENT: 60 TO 110 PERCENT OF RATED.
g. ACCELERATION RATE ADJUSTMENT: 0.5 TO 30 SECONDS.
h. DECELERATION RATE ADJUSTMENT: 1 TO 30 SECONDS.

4. COMPONENTS
a. DISPLAY: PROVIDE INTEGRAL DIGITAL DISPLAY TO INDICATE OUTPUT VOLTAGE, OUTPUT FREQUENCY, AND OUTPUT CURRENT.
b. STATUS INDICATORS: SEPARATE INDICATORS FOR OVERCURRENT, OVERVOLTAGE, GROUND FAULT, OVERTEMPERATURE, AND INPUT POWER ON.
c. FURNISH HAND-OFF-AUTOMATIC SELECTOR SWITCH AND MANUAL SPEED CONTROL.
d. INCLUDE UNDERVOLTAGE RELEASE.
e. CONTROL POWER SOURCE: SEPARATE CIRCUIT.
f. DOOR INTERLOCKS: FURNISH MECHANICAL MEANS TO PREVENT OPENING OF EQUIPMENT WITH POWER CONNECTED, OR TO DISCONNECT POWER IF DOOR IS OPENED; INCLUDE MEANS FOR DEFEATING INTERLOCK BY QUALIFIED PERSONS.
g. SAFETY INTERLOCKS: FURNISH TERMINALS FOR REMOTE CONTACT TO INHIBIT STARTING UNDER BOTH MANUAL AND AUTOMATIC MODE.
h. CONTROL INTERLOCKS: FURNISH TERMINALS FOR REMOTE CONTACT TO ALLOW STARTING IN AUTOMATIC MODE.
i. EMERGENCY STOP: USE DYNAMIC BRAKES FOR EMERGENCY STOP FUNCTION.
j. DISCONNECTING MEANS: INCLUDE INTEGRAL FUSED DISCONNECT SWITCH ON THE LINE SIDE OF EACH CONTROLLER.
k. WIRING TERMINATIONS: MATCH CONDUCTOR MATERIALS AND SIZES INDICATED.

C. EXECUTION
1. EXAMINATION
a. VERIFY THAT SURFACE IS SUITABLE FOR CONTROLLER INSTALLATION.
b. DO NOT INSTALL CONTROLLER UNTIL BUILDING ENVIRONMENT CAN BE MAINTAINED WITHIN THE SERVICE CONDITIONS REQUIRED BY THE MANUFACTURER.
2. INSTALLATION
a. INSTALL IN ACCORDANCE WITH NEMA ICS 7.1 AND MANUFACTURER'S INSTRUCTIONS.
b. TIGHTEN ACCESSIBLE CONNECTIONS AND MECHANICAL FASTENERS AFTER PLACING CONTROLLER.
3. FIELD QUALITY CONTROL
a. PROVIDE THE SERVICE OF THE MANUFACTURER'S FIELD REPRESENTATIVE TO PREPARE AND START CONTROLLERS.
b. INSPECT AND TEST IN ACCORDANCE WITH NETA ATS, EXCEPT SECTION 4.
c. PERFORM INSPECTIONS AND TESTS LISTED IN NETA ATS, SECTION 7.17.
4. ADJUSTING
a. MAKE FINAL ADJUSTMENTS TO INSTALLED CONTROLLER TO ASSURE PROPER OPERATION OF LOAD SYSTEM. OBTAIN PERFORMANCE REQUIREMENTS FROM INSTALLER OF DRIVEN LOADS.
5. CLOSEOUT ACTIVITIES
a. DEMONSTRATE OPERATION OF CONTROLLERS IN AUTOMATIC AND MANUAL MODES.
6. MAINTENANCE
a. PROVIDE SERVICE AND MAINTENANCE OF CONTROLLERS FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION.

LOW-VOLTAGE TRANSFORMERS

A. GENERAL
1. REFERENCE STANDARDS
a. 10 CFR 431, SUBPART K - ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT - DISTRIBUTION TRANSFORMERS; CURRENT EDITION.
b. IEEE C57.94 - RECOMMENDED PRACTICE FOR INSTALLATION, APPLICATION, OPERATION, AND MAINTENANCE OF DRY-TYPE GENERAL PURPOSE DISTRIBUTION AND POWER TRANSFORMERS; INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS; 1982 (R2006).
c. IEEE C57.96 - GUIDE FOR LOADING DRY-TYPE DISTRIBUTION AND POWER TRANSFORMERS; INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS; 1999 (R2004).
d. NECA 1 - STANDARD FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION; NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION; 2010.
e. NECA 409 - STANDARD FOR INSTALLING AND MAINTAINING DRY-TYPE TRANSFORMERS; NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION; 2009.
f. NEMA ST 20 - DRY-TYPE TRANSFORMERS FOR GENERAL APPLICATIONS; NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION; 2014.
g. NEMA 250 - ENCLOSURES FOR ELECTRICAL EQUIPMENT (1000 VOLTS MAXIMUM); NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION; 2014
h. NFPA 70 - NATIONAL ELECTRICAL CODE; NATIONAL FIRE PROTECTION ASSOCIATION; MOST RECENT EDITION ADOPTED BY AUTHORITY HAVING JURISDICTION, INCLUDING ALL APPLICABLE AMENDMENTS AND SUPPLEMENTS.
i. UL 506 - STANDARD FOR SPECIALTY TRANSFORMERS; CURRENT EDITION, INCLUDING ALL REVISIONS.
j. UL 1561 - STANDARD FOR DRY-TYPE GENERAL PURPOSE AND POWER TRANSFORMERS; CURRENT EDITION, INCLUDING ALL REVISIONS.

B. PRODUCTS
1. TRANSFORMERS - GENERAL REQUIREMENTS
a. DESCRIPTION: FACTORY-ASSEMBLED, DRY TYPE TRANSFORMERS FOR 60 HZ OPERATION DESIGNED AND MANUFACTURED IN ACCORDANCE WITH NEMA ST 20 AND LISTED, CLASSIFIED, AND LABELED AS SUITABLE FOR THE PURPOSE INTENDED.
b. UNLESS NOTED OTHERWISE, TRANSFORMER RATINGS INDICATED ARE FOR CONTINUOUS LOADING ACCORDING TO IEEE C57.96 UNDER THE FOLLOWING SERVICE CONDITIONS:
1) ALTITUDE: LESS THAN 3,300 FEET (1,000 M).
2) AMBIENT TEMPERATURE:
a) GREATER THAN 10 KVA: NOT EXCEEDING 104 DEGREES F (40 DEGREES C).
b) LESS THAN 10 KVA: NOT EXCEEDING 77 DEGREES F (25 DEGREES C).
c. CORE: HIGH GRADE, NON-AGING SILICON STEEL WITH HIGH MAGNETIC PERMEABILITY AND LOW HYSTERESIS AND EDDY CURRENT LOSSES. KEEP MAGNETIC FLUX DENSITIES SUBSTANTIALLY BELOW SATURATION POINT, EVEN AT 10 PERCENT PRIMARY OVERVOLTAGE. TIGHTLY CLAMP CORE LAMINATIONS TO PREVENT PLATE MOVEMENT AND MAINTAIN CONSISTENT PRESSURE THROUGHOUT CORE LENGTH.
d. IMPREGNATE CORE AND COIL ASSEMBLY WITH NON-HYDROSCOPIC THERMO-SETTING VARNISH TO EFFECTIVELY SEAL OUT MOISTURE AND OTHER CONTAMINANTS.
e. BASIC IMPULSE LEVEL: 10 KV.
f. GROUND CORE AND COIL ASSEMBLY TO ENCLOSURE BY MEANS OF A VISIBLE FLEXIBLE COPPER GROUNDING STRAP.
g. ISOLATE CORE AND COIL FROM ENCLOSURE USING VIBRATION-ABSORBING MOUNTS.
h. NAMEPLATE: INCLUDE TRANSFORMER CONNECTION DATA, RATINGS, WIRING DIAGRAMS, AND OVERLOAD CAPACITY BASED ON RATED WINDING TEMPERATURE RISE.
2. GENERAL PURPOSE TRANSFORMERS
a. DESCRIPTION: SELF-COOLED, TWO WINDING TRANSFORMERS LISTED AND LABELED AS COMPLYING WITH UL 506 OR UL 1561; RATINGS AS INDICATED ON THE DRAWINGS.
b. INSULATION SYSTEM AND ALLOWABLE AVERAGE WINDING TEMPERATURE RISE:
1) LESS THAN 15 KVA: CLASS 180 DEGREES C INSULATION SYSTEM WITH 115 DEGREES C AVERAGE WINDING TEMPERATURE RISE.
2) 15 KVA AND LARGER: CLASS 220 DEGREES C INSULATION SYSTEM WITH 150 DEGREES C AVERAGE WINDING TEMPERATURE RISE.
c. COIL CONDUCTORS: CONTINUOUS ALUMINUM WINDINGS WITH TERMINATIONS BRAZED OR WELDED.
d. WINDING TAPS:
1) LESS THAN 3 KVA: NONE.
2) 3 KVA THROUGH 15 KVA: TWO 5 PERCENT FULL CAPACITY PRIMARY TAPS BELOW RATED VOLTAGE.
3) 15 KVA THROUGH 300 KVA: TWO 2.5 PERCENT FULL CAPACITY PRIMARY TAPS ABOVE AND FOUR 2.5 PERCENT FULL CAPACITY PRIMARY TAPS BELOW RATED VOLTAGE.
4) 500 KVA AND LARGER: TWO 2.5 PERCENT FULL CAPACITY PRIMARY TAPS ABOVE AND TWO 2.5 PERCENT FULL CAPACITY PRIMARY TAPS BELOW RATED VOLTAGE.
e. ENERGY EFFICIENCY: COMPLY WITH 10 CFR 431, SUBPART K.
f. SOUND LEVELS: STANDARD SOUND LEVELS COMPLYING WITH NEMA ST 20.
g. MOUNTING PROVISIONS:
1) LESS THAN 15 KVA: SUITABLE FOR WALL MOUNTING.
2) 15 KVA THROUGH 75 KVA: SUITABLE FOR WALL, FLOOR, OR TRAPEZE MOUNTING.
3) LARGER THAN 75 KVA: SUITABLE FOR FLOOR MOUNTING.
h. TRANSFORMER ENCLOSURE: COMPLY WITH NEMA ST 20.
1) ENVIRONMENT TYPE PER NEMA 250: UNLESS OTHERWISE INDICATED, AS SPECIFIED FOR THE FOLLOWING INSTALLATION LOCATIONS:
2) CONSTRUCTION: STEEL.
a) LESS THAN 15 KVA: TOTALLY ENCLOSED, NON-VENTILATED.
b) 15 KVA AND LARGER: VENTILATED.
3) FINISH: MANUFACTURER'S STANDARD GREY, SUITABLE FOR OUTDOOR INSTALLATIONS.
4) PROVIDE LIFTING EYES OR BRACKETS.
i. ACCESSORIES:
1) MOUNTING BRACKETS: PROVIDE MANUFACTURER'S STANDARD BRACKETS.
2) WEATHERSHIELD KITS: PROVIDE FOR VENTILATED TRANSFORMERS INSTALLED OUTDOORS TO PROVIDE A LISTED NEMA 250, TYPE 3R ASSEMBLY.
3) LUG KITS: SIZED AS REQUIRED FOR TERMINATION OF CONDUCTORS AS INDICATED ON THE DRAWINGS.

C. EXECUTION
1. INSTALLATION
a. PERFORM WORK IN A NEAT AND WORKMANLIKE MANNER IN ACCORDANCE WITH NECA 1.
b. INSTALL TRANSFORMERS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
c. INSTALL TRANSFORMERS IN ACCORDANCE WITH NECA 409 AND IEEE C57.94.
d. USE FLEXIBLE CONDUIT, UNDER THE PROVISIONS OF SECTION 26 0534, 2 FEET (600 MM) MINIMUM LENGTH, FOR CONNECTIONS TO TRANSFORMER CASE. MAKE CONDUIT CONNECTIONS TO SIDE PANEL OF ENCLOSURE.
e. ARRANGE EQUIPMENT TO PROVIDE MINIMUM CLEARANCES AS SPECIFIED ON TRANSFORMER NAMEPLATE AND IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND NFPA 70.
f. MOUNT WALL-MOUNTED TRANSFORMERS USING INTEGRAL FLANGES OR ACCESSORY BRACKETS FURNISHED BY THE MANUFACTURER.
g. MOUNT FLOOR-MOUNTED TRANSFORMERS ON PROPERLY SIZED 3 INCH (80 MM) HIGH CONCRETE PAD CONSTRUCTED IN ACCORDANCE WITH SECTION 03 3000.
h. MOUNT FLOOR-MOUNTED, TRAPEZE-MOUNTED, WALL-MOUNTED, AND CEILING-MOUNTED TRANSFORMERS USING VIBRATION ISOLATORS SUITABLE FOR ISOLATING THE TRANSFORMER NOISE FROM THE BUILDING STRUCTURE.
i. MOUNT TRAPEZE-MOUNTED TRANSFORMERS AS INDICATED.
j. PROVIDE SEISMIC RESTRAINTS.
k. PROVIDE GROUNDING AND BONDING IN ACCORDANCE WITH SECTION 26 0526.
l. REMOVE SHIPPING BRACES AND ADJUST BOLTS THAT ATTACH THE CORE AND COIL MOUNTING BRACKET TO THE ENCLOSURE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS IN ORDER TO REDUCE AUDIBLE NOISE TRANSMISSION.
m. WHERE NOT FACTORY-INSTALLED, INSTALL LUGS SIZED AS REQUIRED FOR TERMINATION OF CONDUCTORS AS SHOWN ON THE DRAWINGS.
n. WHERE FURNISHED AS A SEPARATE ACCESSORY, INSTALL TRANSFORMER WEATHERSHIELD PER MANUFACTURER'S INSTRUCTIONS.
2. ADJUSTING
a. MEASURE PRIMARY AND SECONDARY VOLTAGES AND MAKE APPROPRIATE TAP ADJUSTMENTS.
b. ADJUST TIGHTNESS OF MECHANICAL AND ELECTRICAL CONNECTIONS TO MANUFACTURER'S RECOMMENDED TORQUE SETTINGS.
3. CLEANING
a. CLEAN DIRT AND DEBRIS FROM TRANSFORMER COMPONENTS ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
b. REPAIR SCRATCHED OR MARRED EXTERIOR SURFACES TO MATCH ORIGINAL FACTORY FINISH.

INSTRUMENTATION

A. CONTROL PANEL ASSEMBLE AND PROGRAMMED BY CONTRACTOR UNDER DIRECTION OF DELCO WESTERN (801-972-0900) AND WOLF CREEK WATER AND SEWER IMPROVEMENT DISTRICT. CONTRACTOR MAY OPT TO ENGAGE DELCO WESTERN TO CONSTRUCT CONTROL PANEL.

B. WELL LEVEL
1. PS98I TRANSMITTER 4-20MA
2. INSTALL IN SOUNDER TUBE JUST ABOVE THE PUMP DISCHARGE.
3. LENGTH OF CABLE AND RANGE DETERMINED BY CONTRACTOR PER WELL DEPTH & FIELD CONDITIONS

B. FLOW METER
1. SIEMENS 5100W FLOW METER WITH 6000 DISPLAY.
2. 4-20MA OUTPUT & PULSE OUTPUT

C. DOOR INTRUSION
1. MAGNETIC REED SWITCH
2. CONNECT DIRECTLY INTO MISSION REMOTE TELEMETRY UNIT.
3. LOCAL SUPPLIER, NO SPECIFIC BRAND OR MODEL.
4. COORDINATE NORMALLY OPEN OR NORMALLY CLOSED CONTACT WITH TELEMETRY PROGRAMMING

D. LINE PRESSURE MONITORING
1. LOCAL SUPPLIER, NO SPECIFIC BRAND OR MODEL.
2. TRANSMITTER ONLY, NO DISPLAY REQUIRED. (MISSION RTU WILL DISPLAY PRESSURE ON LOCAL SCREEN)

E. VFD
1. DANFOSS VLT FC202
2. NO SUBSTITUTIONS, INDICATED MODEL HAS OWNER'S DESIRED THE PARAMETERS AND RAMP TIME.
3. PROVIDE LOAD SIDE WAVE FILTER AS REQUIRED FOR MOTOR PROTECTION AND TO MAINTAIN MOTOR WARRANTY.
4. PROGRAM AS DIRECTED BY OWNER.

F. TELEMETRY UNIT
1. DELCO WESTERN IS THE MISSION COMMUNICATION DISTRIBUTOR FOR UTAH, IDAHO AND EASTERN NEVADA .
2. COORDINATE MATERIALS AND INSTALLATION WITH WOLF CREEK WATER ID SCADA PRIOR TO BEGINNING WORK.
a. MYDRO 850 RTU
1) OP653 DIGITAL INPUT MODULE
2) OP485 ANALOG INPUT MODULE
3) OP461 ANALOG OUTPUT MODULE
4) OP464-30 PULSE INPUT MODULE
b. OMNI DIRECTIONAL ANTENNA WITH RG-58 CABLE SMA-F

G. PUMP PROTECTION UNIT
1. PROVIDE PUMP PROTECTION AS REQUIRED TO MAINTAIN MANUFACTURER'S WARRANTY. (I.E. SEAL FAIL ALARM, VIBRATION ALARM, THERMAL ALARM, LOW INTAKE PRESSURE, HIGH DISCHARGE PRESSURE, ETC.)
2. CONNECT ALARM SIGNAL(S) TO RTU FOR PUMP SHUTDOWN/FAIL SIGNAL

H. EXECUTION
1. INSTALLATION AND TERMINATION FOR MISSION RTU/SCADA BY CONTRACTOR PER OWNER'S DIRECTIVES.
2. TEST AND SETUP OF UNIT/INPUTS AND OUTPUTS BY CONTRACTOR PER OWNER'S DIRECTIVES.
3. I/O SHALL INCLUDE BUT NOT LIMITED TO:
i. PUMP MOTOR START/STOP
j. PUMP MOTOR SPEED
k. PUMP TROUBLE (FAIL)
l. MOTOR PROTECTION SEAL SENSOR ALARM
m. MOTOR PROTECTION VIBRATION SENSOR ALARM
n. WELL LEVEL
o. PRESSURE
p. FLOW
q. INTRUSION MONITOR
r. INTRUSION ALARM CLEAR
s. WELL CONTROL VALVE (WASTE VALVE) OPEN/CLOSE

Date: 11/14/22
Scale:
Revisions
Date | Description
BREINHOLT
POWER ENGINEERING, PLLC
805 SOUTH 1430 WEST, LEHI UT 84043
(801) 367-5180 PROJECT: BPE22J2

REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
January 2023
STATE OF UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

ELECTRICAL SPECIFICATIONS
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

<u>ENGINE GENERATORS</u>

A. SECTION INCLUDES
1. PACKAGED ENGINE GENERATOR SYSTEM AND ASSOCIATED COMPONENTS AND ACCESSORIES:
   a. ENGINE AND ENGINE ACCESSORY EQUIPMENT.
   b. ALTERNATOR (GENERATOR).
   c. GENERATOR SET CONTROL SYSTEM.
   d. GENERATOR SET ENCLOSURE.
   e. TRANSFER SWITCH

B. MANUFACTURERS
1. PACKAGED ENGINE GENERATOR SET:
   a. CATERPILLAR INC: WWW.CAT.COM/POWER-GENERATION.
   b. CUMMINS POWER GENERATION INC: WWW.CUMMINSPOWER.COM.
   c. GENERAC POWER SYSTEMS: WWW.GENERAC.COM/INDUSTRIAL.
   d. KOHLER CO: WWW.KOHLERPOWER.COM.

C. PACKAGED ENGINE GENERATOR SYSTEM
1. PROVIDE NEW ENGINE GENERATOR SYSTEM CONSISTING OF ALL REQUIRED EQUIPMENT, SENSORS, CONDUIT, BOXES, WIRING, PIPING, SUPPORTS, ACCESSORIES, SYSTEM PROGRAMMING, ETC. AS NECESSARY FOR A COMPLETE OPERATING SYSTEM THAT PROVIDES THE FUNCTIONAL INTENT INDICATED.
2. SYSTEM DESCRIPTION:
   a. APPLICATION: EMERGENCY/STANDBY.
   b. CONFIGURATION: SINGLE PACKAGED ENGINE GENERATOR SET OPERATED INDEPENDENTLY (NOT IN PARALLEL).
3. PACKAGED ENGINE GENERATOR SET:
   a. TYPE: NATURAL GAS
   b. POWER RATING: AS INDICATED ON DRAWINGS, STANDBY.
   c. VOLTAGE: AS INDICATED ON DRAWINGS.
   d. MAIN LINE CIRCUIT BREAKER:
      1) TYPE: THERMAL MAGNETIC.
      2) TRIP RATING: SELECT ACCORDING TO GENERATOR SET RATING.
4. GENERATOR SET GENERAL REQUIREMENTS:
   a. PROTOTYPE TESTED IN ACCORDANCE WITH NFPA 110 FOR LEVEL 1 SYSTEMS.
   b. FACTORY-ASSEMBLED, WITH COMPONENTS MOUNTED ON SUITABLE BASE.
   c. LIST AND LABEL ENGINE GENERATOR ASSEMBLY AS COMPLYING WITH UL 2200.
   d. POWER FACTOR: UNLESS OTHERWISE INDICATED, SPECIFIED POWER RATINGS ARE AT 0.8 POWER FACTOR FOR THREE PHASE VOLTAGES AND 1.0 POWER FACTOR FOR SINGLE PHASE VOLTAGES.
   e. PROVIDE SUITABLE GUARDS TO PROTECT PERSONNEL FROM ACCIDENTAL CONTACT WITH ROTATING PARTS, HOT PIPING, AND OTHER POTENTIAL SOURCES OF INJURY.
   f. MAIN LINE CIRCUIT BREAKERS: PROVIDE FACTORY-INSTALLED LINE SIDE CONNECTIONS WITH SUITABLE LUGS FOR LOAD SIDE CONNECTIONS.
5. SERVICE CONDITIONS: PROVIDE ENGINE GENERATOR SYSTEM AND ASSOCIATED COMPONENTS SUITABLE FOR OPERATION UNDER THE SERVICE CONDITIONS AT THE INSTALLED LOCATION.
   a. ALTITUDE: 5500 FEET.
6. STARTING AND LOAD ACCEPTANCE REQUIREMENTS:
   a. CRANKING METHOD: CYCLE CRANKING COMPLYING WITH NFPA 110 (15 SECOND CRANK PERIOD, FOLLOWED BY 15 SECOND REST PERIOD, WITH CRANKING LIMITER TIME-OUT AFTER 3 CYCLES), UNLESS OTHERWISE REQUIRED.
   b. CRANKING LIMITER TIME-OUT: IF GENERATOR SET FAILS TO START AFTER SPECIFIED CRANKING PERIOD, INDICATE OVERCRANK ALARM CONDITION AND LOCK-OUT GENERATOR SET FROM FURTHER CRANKING UNTIL MANUALLY RESET.
   c. START TIME: CAPABLE OF STARTING AND ACHIEVING CONDITIONS NECESSARY FOR LOAD ACCEPTANCE WITHIN 10 SECONDS (NFPA 110, TYPE 10).
   d. MAXIMUM LOAD STEP: SUPPORTS 100 PERCENT OF RATED LOAD IN ONE STEP.
7. EXHAUST EMISSIONS REQUIREMENTS:
   a. COMPLY WITH FEDERAL (EPA), STATE, AND LOCAL REGULATIONS APPLICABLE AT THE TIME OF COMMISSIONING; INCLUDE FACTORY EMISSIONS CERTIFICATION WITH SUBMITTALS.
   b. DO NOT MAKE MODIFICATIONS AFFECTING GENERATOR SET FACTORY EMISSIONS CERTIFICATION WITHOUT APPROVAL OF MANUFACTURER AND ENGINEER. WHERE SUCH MODIFICATIONS ARE MADE, PROVIDE FIELD EMISSIONS TESTING AS NECESSARY FOR CERTIFICATION.

D. ENGINE AND ENGINE ACCESSORY EQUIPMENT
1. PROVIDE ENGINE WITH ADEQUATE HORSEPOWER TO ACHIEVE SPECIFIED POWER OUTPUT AT RATED SPEED, ACCOUNTING FOR ALTERNATOR EFFICIENCY AND PARASITIC LOADS.
2. ENGINE STARTING SYSTEM:
   a. SYSTEM TYPE: ELECTRIC, WITH DC SOLENOID-ACTIVATED STARTING MOTOR(S).
   b. BATTERY(S):
      1) BATTERY TYPE: LEAD-ACID.
      2) BATTERY CAPACITY: SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS FOR ACHIEVING STARTING AND LOAD ACCEPTANCE REQUIREMENTS UNDER WORST CASE AMBIENT TEMPERATURE; CAPABLE OF PROVIDING CRANKING THROUGH TWO COMPLETE PERIODS OF CRANKING LIMITER TIME-OUTS WITHOUT RECHARGING.
      3) PROVIDE BATTERY RACK, CABLES, AND CONNECTORS SUITABLE FOR THE SUPPLIED BATTERY(S); SIZE BATTERY CABLES ACCORDING TO MANUFACTURER'S RECOMMENDATIONS FOR CABLE LENGTH TO BE INSTALLED.
   c. BATTERY-CHARGING ALTERNATOR: ENGINE-DRIVEN, WITH INTEGRAL SOLID-STATE VOLTAGE REGULATION.
   d. BATTERY CHARGER:
      1) PROVIDE DUAL RATE BATTERY CHARGER WITH AUTOMATIC FLOAT AND EQUALIZE CHARGING MODES AND MINIMUM RATING OF 10 AMPS; SUITABLE FOR MAINTAINING THE SUPPLIED BATTERY(S) AT FULL CHARGE WITHOUT MANUAL INTERVENTION.
      2) CAPABLE OF RETURNING SUPPLIED BATTERY(S) FROM FULLY DISCHARGED TO FULLY CHARGED CONDITION WITHIN 24 HOURS, AS REQUIRED BY NFPA 110 FOR LEVEL 1 APPLICATIONS WHILE CARRYING NORMAL LOADS.
      3) RECOGNIZED AS COMPLYING WITH UL 1236.
      4) FURNISHED WITH INTEGRAL OVERCURRENT PROTECTION; CURRENT LIMITED TO PROTECT CHARGER DURING ENGINE CRANKING; REVERSE POLARITY PROTECTION.
      5) PROVIDE INTEGRAL DC OUTPUT AMMETER AND VOLTMETER WITH FIVE PERCENT ACCURACY.
      6) PROVIDE ALARM OUTPUT CONTACTS AS NECESSARY FOR ALARM INDICATIONS.
4. ENGINE SPEED CONTROL SYSTEM (GOVERNOR):
   a. SINGLE ENGINE GENERATOR SETS (NOT OPERATED IN PARALLEL): PROVIDE ELECTRONIC ISOCHRONOUS GOVERNOR FOR CONTROLLING ENGINE SPEED/ALTERNATOR FREQUENCY.
   b. FREQUENCY REGULATION, ELECTRONIC ISOCHRONOUS GOVERNORS: NO CHANGE IN FREQUENCY FROM NO LOAD TO FULL LOAD; PLUS/MINUS 0.25 PERCENT AT STEADY STATE.
5. ENGINE LUBRICATION SYSTEM:
   a. SYSTEM TYPE: FULL PRESSURE, WITH ENGINE-DRIVEN, POSITIVE DISPLACEMENT LUBRICATION OIL PUMP, REPLACEABLE FULL-FLOW OIL FILTER(S), AND DIP-STICK FOR OIL LEVEL INDICATION. PROVIDE OIL COOLER WHERE RECOMMENDED BY MANUFACTURER.
6. ENGINE COOLING SYSTEM:
   a. SYSTEM TYPE: CLOSED-LOOP, LIQUID-COOLED, WITH UNIT-MOUNTED RADIATOR/FAN AND ENGINE-DRIVEN COOLANT PUMP; SUITABLE FOR PROVIDING ADEQUATE COOLING WHILE OPERATING AT FULL LOAD UNDER WORST CASE AMBIENT TEMPERATURE.
   b. FAN GUARD: PROVIDE SUITABLE GUARD TO PROTECT PERSONNEL FROM ACCIDENTAL CONTACT WITH FAN.
   c. COOLANT HEATER: PROVIDE THERMOSTATICALLY CONTROLLED COOLANT HEATER TO IMPROVE STARTING UNDER COLD AMBIENT CONDITIONS; SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS FOR ACHIEVING STARTING AND LOAD ACCEPTANCE REQUIREMENTS UNDER WORST CASE AMBIENT TEMPERATURE.
7. ENGINE AIR INTAKE AND EXHAUST SYSTEM:
   a. AIR INTAKE FILTRATION: PROVIDE ENGINE-MOUNTED, REPLACEABLE, DRY ELEMENT FILTER.
   b. ENGINE EXHAUST CONNECTION: PROVIDE SUITABLE, APPROVED FLEXIBLE CONNECTOR FOR COUPLING ENGINE TO EXHAUST SYSTEM.
8. ENGINE ACCESSORIES: LUBE OIL FILTER, INTAKE AIR FILTER, LUBE OIL COOLER, GEAR-DRIVEN WATER PUMP. WATER TEMPERATURE GAGE, AND LUBE OIL PRESSURE GAGE ON ENGINE/GENERATOR CONTROL PANEL.

E. ALTERNATOR (GENERATOR)
1. ALTERNATOR: 4-POLE, 1800 RPM (60 HZ OUTPUT) REVOLVING FIELD, SYNCHRONOUS GENERATOR COMPLYING WITH NEMA MG 1; CONNECTED TO ENGINE WITH FLEXIBLE COUPLING; VOLTAGE OUTPUT CONFIGURATION AS INDICATED, WITH RECONNECTABLE LEADS FOR 3 PHASE ALTERNATORS.
2. EXCITER:
   a. EXCITER TYPE: BRUSHLESS; PROVIDE PERMANENT MAGNET GENERATOR (PMG) EXCITATION SYSTEM; SELF-EXCITED (SHUNT) SYSTEMS ARE NOT PERMITTED.
   b. PMG EXCITATION SHORT-CIRCUIT CURRENT SUPPORT: CAPABLE OF SUSTAINING 300 PERCENT OF RATED OUTPUT CURRENT FOR 10 SECONDS.
   c. VOLTAGE REGULATION (WITH PMG EXCITATION): PLUS/MINUS 0.5 PERCENT FOR ANY CONSTANT LOAD FROM NO LOAD TO FULL LOAD.
3. TEMPERATURE RISE: COMPLY WITH UL 2200.
4. INSULATION SYSTEM: NEMA MG 1, CLASS H; SUITABLE FOR ALTERNATOR TEMPERATURE RISE.
5. ENCLOSURE: NEMA MG 1, DRIP-PROOF.
6. TOTAL HARMONIC DISTORTION: NOT GREATER THAN FIVE PERCENT.

F. GENERATOR SET CONTROL SYSTEM
1. PROVIDE MICROPROCESSOR-BASED CONTROL SYSTEM FOR AUTOMATIC CONTROL, MONITORING, AND PROTECTION OF GENERATOR SET. INCLUDE SENSORS, WIRING, AND CONNECTIONS NECESSARY FOR FUNCTIONS/INDICATIONS SPECIFIED.
2. CONTROL PANEL:
   a. CONTROL PANEL MOUNTING: UNIT-MOUNTED UNLESS OTHERWISE INDICATED; VIBRATION ISOLATED.
   b. GENERATOR SET CONTROL FUNCTIONS:
      1) AUTOMATIC MODE: INITIATES GENERATOR SET START/SHUTDOWN UPON RECEIVING CORRESPONDING SIGNAL FROM REMOTE DEVICE (E.G. AUTOMATIC TRANSFER SWITCH).
      2) MANUAL MODE: INITIATES GENERATOR SET START/SHUTDOWN UPON DIRECTION FROM OPERATOR.
      3) RESET MODE: CLEARS ALL FAULTS, ALLOWING GENERATOR SET RESTART AFTER A SHUTDOWN.
      4) EMERGENCY STOP: IMMEDIATELY SHUTS DOWN GENERATOR SET (WITHOUT TIME DELAY) AND PREVENTS AUTOMATIC RESTARTING UNTIL MANUALLY RESET.
      5) CYCLE CRANKING: PROGRAMMABLE CRANK TIME, REST TIME, AND NUMBER OF CYCLES.
      6) TIME DELAY: PROGRAMMABLE FOR SHUTDOWN (ENGINE COOLDOWN) AND START (ENGINE WARMUP).
      7) VOLTAGE ADJUSTMENT: ADJUSTABLE THROUGH RANGE OF PLUS/MINUS 5 PERCENT.
   c. GENERATOR SET STATUS INDICATIONS:
      1) VOLTAGE (VOLTS AC): LINE-TO-LINE, LINE-TO-NEUTRAL FOR EACH PHASE.
      2) CURRENT (AMPS): FOR EACH PHASE.
      3) FREQUENCY (HZ).
      4) REAL POWER (W/KW).
      5) REACTIVE POWER (VAR/KVAR).
      6) APPARENT POWER (VA/KVA).
      7) POWER FACTOR.
      8) DUTY LEVEL: ACTUAL LOAD AS PERCENTAGE OF RATED POWER.
      9) ENGINE SPEED (RPM).
      10) BATTERY VOLTAGE (VOLTS DC).
      11) ENGINE OIL PRESSURE.
      12) ENGINE COOLANT TEMPERATURE.
      13) ENGINE RUN TIME.
      14) GENERATOR POWERING LOAD (POSITION SIGNAL FROM TRANSFER SWITCH).
   d. GENERATOR SET PROTECTION AND WARNING/SHUTDOWN INDICATIONS:
      1) COMPLY WITH NFPA 110; CONFIGURABLE FOR NFPA 110 LEVEL 1 OR LEVEL 2, OR NFPA 99 SYSTEMS
      2) IN ADDITION TO NFPA 110 REQUIREMENTS, PROVIDE THE FOLLOWING PROTECTIONS/INDICATIONS:
         a) HIGH AC VOLTAGE (SHUTDOWN).
         b) LOW AC VOLTAGE (SHUTDOWN).
         c) HIGH FREQUENCY (SHUTDOWN).
         d) LOW FREQUENCY (SHUTDOWN).
         e) OVERCURRENT (SHUTDOWN).
      3) PROVIDE CONTACTS FOR LOCAL AND REMOTE COMMON ALARM.
      4) PROVIDE LAMP TEST FUNCTION THAT ILLUMINATES ALL INDICATOR LAMPS.
   e. OTHER CONTROL PANEL FEATURES:
      1) EVENT LOG.
3. REMOTE ANNUNCIATOR:
   a. REMOTE ANNUNCIATOR MOUNTING: WALL-MOUNTED; PROVIDE FLUSH-MOUNTED OR SURFACE-MOUNTED ANNUNCIATOR AS INDICATED.
   b. GENERATOR SET STATUS INDICATIONS:
      1) GENERATOR POWERING LOAD (VIA POSITION SIGNAL FROM TRANSFER SWITCH).
      2) COMMUNICATION FUNCTIONAL.
   c. GENERATOR SET WARNING/SHUTDOWN INDICATIONS:
      1) COMPLY WITH NFPA 110 FOR LEVEL 1 SYSTEMS
      2) PROVIDE AUDIBLE ALARM WITH SILENCE FUNCTION.
      3) PROVIDE LAMP TEST FUNCTION THAT ILLUMINATES ALL INDICATOR LAMPS.

G. GENERATOR SET ENCLOSURE
1. ENCLOSURE TYPE: NONE (INSTALLED INDOORS)

H. INSTALLATION
1. PERFORM WORK IN A NEAT AND WORKMANLIKE MANNER IN ACCORDANCE WITH NECA 1.
2. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. INSTALL GENERATOR SETS AND ASSOCIATED ACCESSORIES IN ACCORDANCE WITH NECA/EGSA 404.
4. ARRANGE EQUIPMENT TO PROVIDE MINIMUM CLEARANCES AND REQUIRED MAINTENANCE ACCESS.
5. UNLESS OTHERWISE INDICATED, MOUNT GENERATOR SET ON PROPERLY SIZED 6 INCH HIGH CONCRETE PAD. PROVIDE SUITABLE VIBRATION ISOLATORS, WHERE NOT FACTORY INSTALLED.
6. PROVIDE REQUIRED SUPPORT AND ATTACHMENT.
7. COORDINATE WALL PENATRATIONS AND PROVIDE EXHAUST THIMBLE AND ACCESSORIES REQUIRED FOR AN INDOOR INSTALLATION.
8. USE MANUFACTURER'S RECOMMENDED OIL AND COOLANT, SUITABLE FOR THE WORST CASE AMBIENT TEMPERATURES.
9. PROVIDE ENGINE EXHAUST PIPING, WHERE NOT FACTORY INSTALLED.
   a. INCLUDE PIPING EXPANSION JOINTS, PIPING INSULATION, THIMBLE, CONDENSATION TRAP/DRAIN, RAIN CAP, HANGERS/SUPPORTS, ETC. AS INDICATED OR AS REQUIRED.
   b. DO NOT EXCEED MANUFACTURER'S MAXIMUM BACK PRESSURE REQUIREMENTS.
10. PROVIDE GROUNDING AND BONDING.

I. FIELD QUALITY CONTROL
1. NOTIFY AUTHORITIES HAVING JURISDICTION AND COMPLY WITH THEIR REQUIREMENTS FOR SCHEDULING INSPECTIONS AND TESTS AND FOR OBSERVATION BY THEIR PERSONNEL.
2. PROVIDE ALL EQUIPMENT, TOOLS, AND SUPPLIES REQUIRED TO ACCOMPLISH INSPECTION AND TESTING, INCLUDING LOAD BANK AND FUEL.
3. PRELIMINARY INSPECTION AND TESTING TO INCLUDE, AT A MINIMUM:
   a. INSPECT EACH SYSTEM COMPONENT FOR DAMAGE AND DEFECTS.
   b. VERIFY TIGHTNESS OF MECHANICAL AND ELECTRICAL CONNECTIONS ARE ACCORDING TO MANUFACTURER'S RECOMMENDED TORQUE SETTINGS.
   c. CHECK FOR PROPER OIL AND COOLANT LEVELS.
4. PREPARE AND START SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
5. PERFORM ACCEPTANCE TEST IN ACCORDANCE WITH NFPA 110.
6. PROVIDE FIELD EMISSIONS TESTING WHERE NECESSARY FOR CERTIFICATION.
7. CORRECT DEFECTIVE WORK, ADJUST FOR PROPER OPERATION, AND RETEST UNTIL ENTIRE SYSTEM COMPLIES WITH CONTRACT DOCUMENTS.

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Date	Description

BREINHOLT
POWER ENGINEERING, PLLC
805 SOUTH 1430 WEST, LEHI UT 84043
(801) 367-5180 PROJECT: BPE22J2

REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
January 2023
STATE OF UTAH

ELECTRICAL SPECIFICATIONS
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

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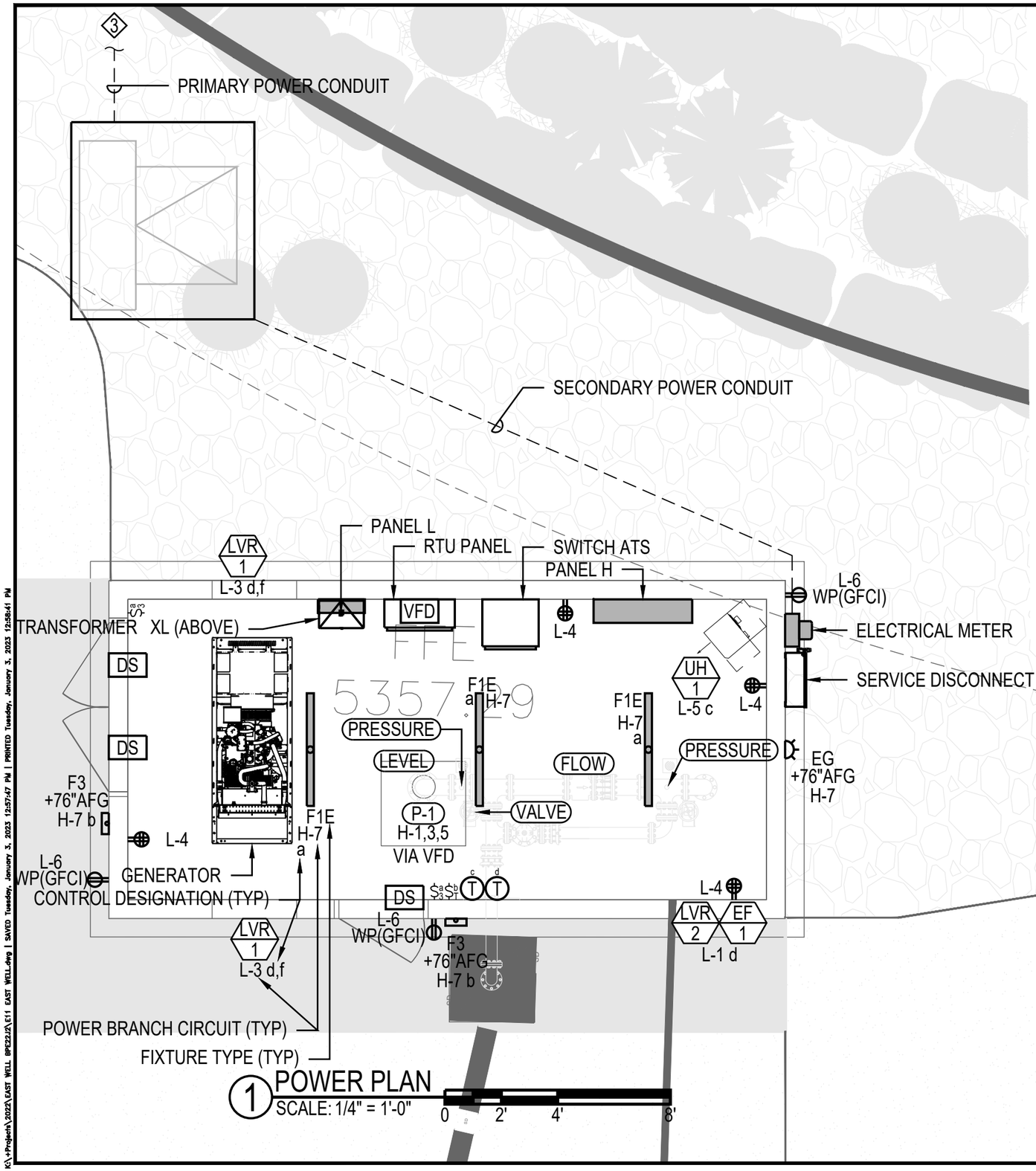

NOTES:

1. LIGHT, LOUVER, HEATER & FAN SEQUENCE OF OPERATION
   LOWER CASE LETTER NEXT TO CONTROL DEVICE AND FIXTURE OR EQUIPMENT INDICATE THE FOLLOWING OPRATION:

   a - TOGGLE SWITCH; MANUAL ON, MANUAL OFF; LIGHTING LOAD. (NEC 110.26 D)
   b - PROGRAMMABLE ASTRONOMICAL TIME SWITCH; DUSK TO MIDNIGHT, 6 AM TO DAWN OPERATION WITH MANUAL OVERRIDE. LIGHTING LOAD.
   c - THERMOSTAT; LOW TEMPERATURE ON, HIGH TEMPERATURE OFF. VERIFY DEAD-BAND WITH OWNER PRIOR TO ORDERING. UNIT HEATER LOAD.
   d - THERMOSTAT; HIGH TEMPERATURE ON, LOW TEMPERATURE OFF. LOUVER & EXHAUST FAN LOAD.
   f - ATS INTERLOCK; OPEN ON GENERATOR OPERATION. LOUVER LOAD.

2. INSTALLATION SHALL COMPLY WITH WEBER COUNTY/UPPER VALLEY DARK SKY ORDINANCE. SEE WWW.DARKSKY.ORG

3 TO LOCATION AS DIRECTED BY ROCKY MOUNTAIN POWER. PROVIDE PER-LINEAR FOOT COST FOR CONDUIT AND TRENCHING TO YET TO BE DETERMINED PRIMARY POWER TIE IN.

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805 SOUTH 1400 WEST, LEHI UT 84043
(801) 997-5380 PROJECT #E222

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PRELIMINARY NOT FOR CONSTRUCTION

ELECTRICAL PLAN
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

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TYPE	CONDUIT SIZE		CONDUCTORS		75°C AMP RATING
	PVC	EMT	QUAN.	SIZE	
312	3/4"	3/4"	3	#12	25
48	3/4"	3/4"	4	#8	50
43	1-1/4"	1-1/4"	4	#3	100
41X	1-1/2"	1-1/2"	4	1/0	150
43X	2"	2"	4	3/0	200
450	4"	3-1/2"	4	500 KCMIL	380

EQUIPMENT GROUNDING CONDUCTORS SCHEDULE

OVERCURRENT DEVICE	COPPER
15	14
20	12
30	10
40	10
60	10
100	8
200	6
300	4
400	3
500	2
600	1
800	1/0

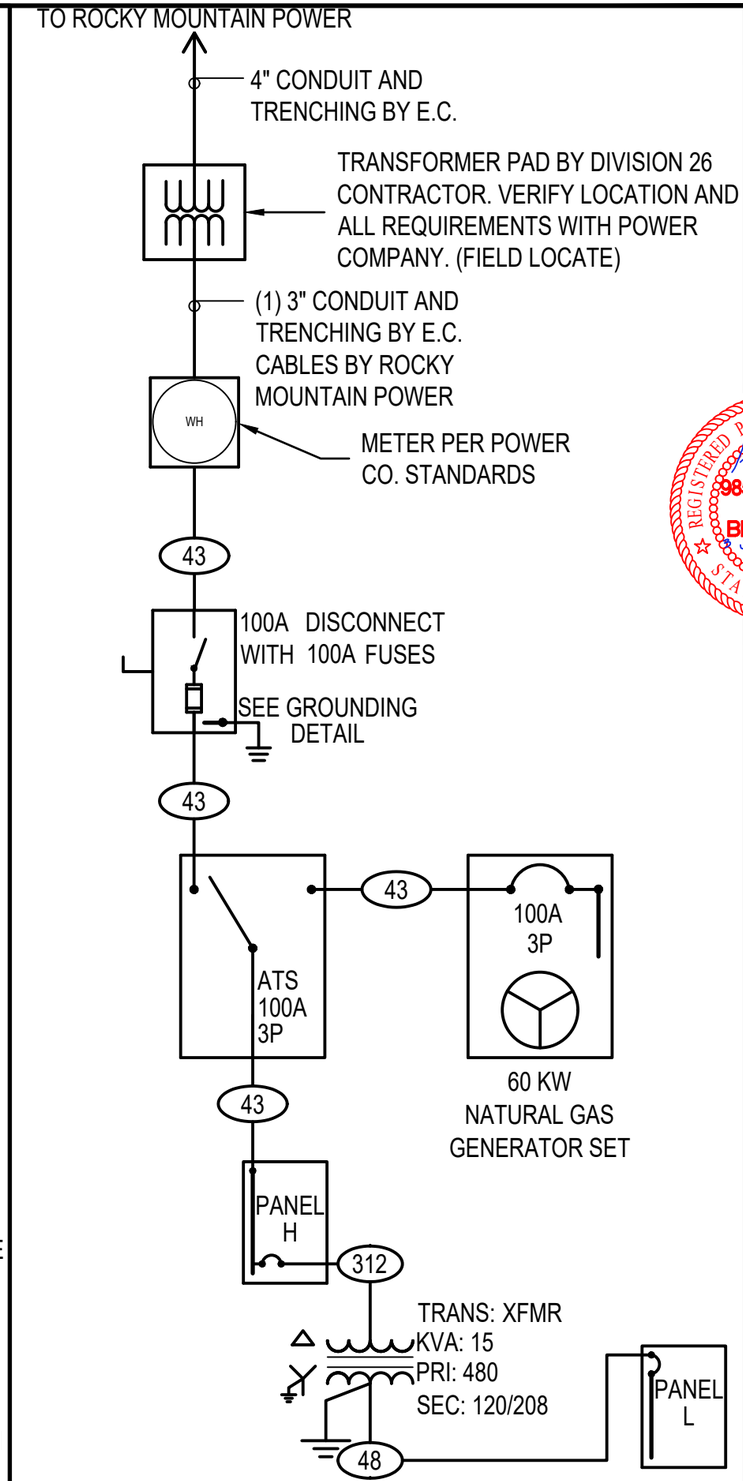
NOTE:

1. SEE EQUIPMENT GROUND CONDUCTOR SCHEDULES OR SERVICE GROUNDING DETAIL FOR GROUND CONDUCTORS RATING.

2. ALL INSULATION SHALL BE THHN (ABOVE GRADE) OR THWN (BELOW GRADE) UNLESS NOTED OTHERWISE.

3. PVC CONDUIT SIZE IS BASED ON SCHEDULE 40 PVC. PVC & THWN ARE APPROVED FOR UNDERGROUND FEEDERS ONLY.

② COPPER FEEDER SCHEDULE



① POWER ONE-LINE DIAGRAM

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BREINHOLT
POWER ENGINEERING, PLLC
805 SOUTH 1400 WEST, LEHI UT 84043
(801) 367-1580 PROJECT #E222

REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
8 January 2023
STATE OF UTAH

ONE-LINE DIAGRAM
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

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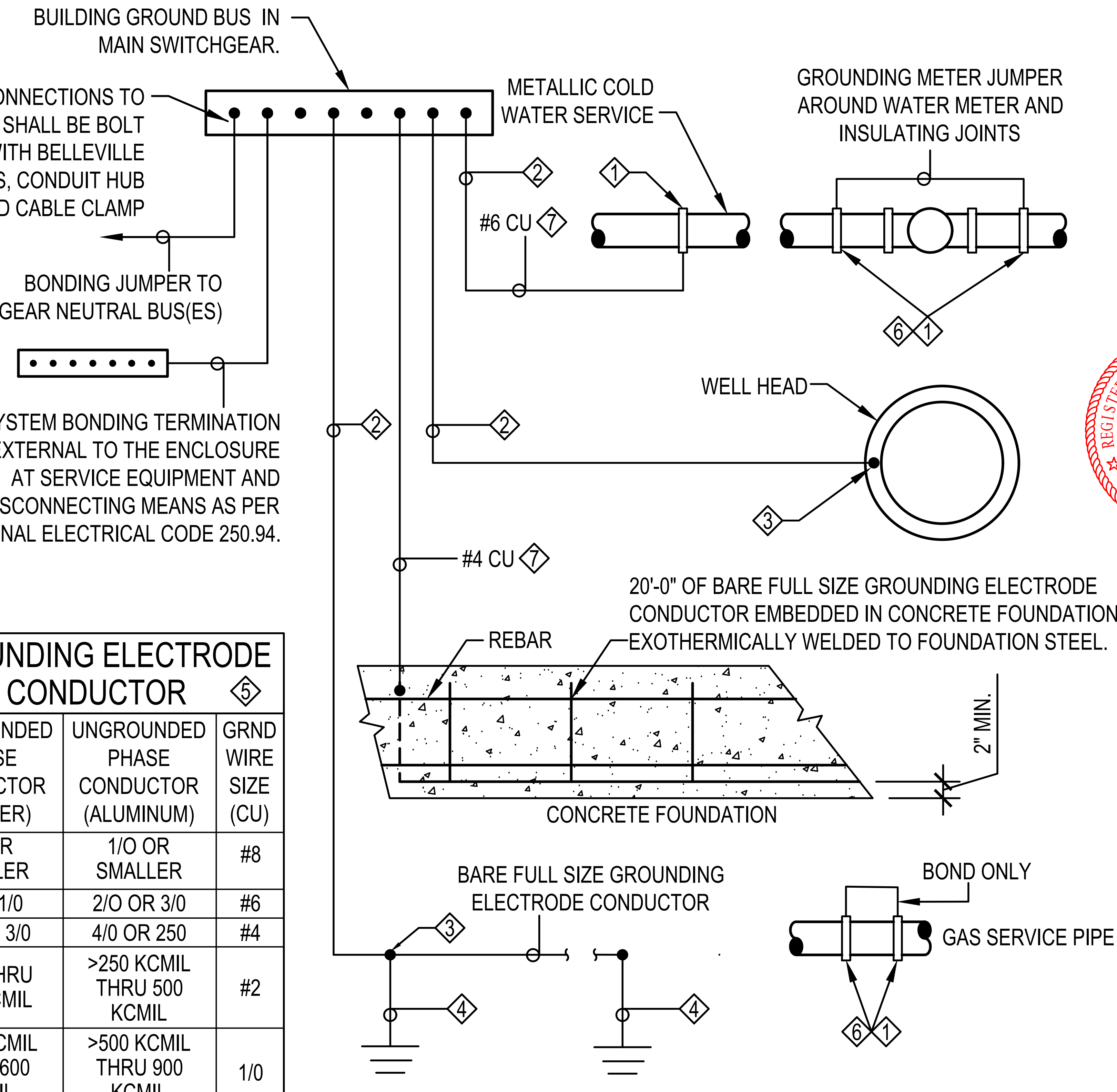
NOTES:

1. T&B 3900 BU GROUND CLAMP WITH 3/4" CONDUIT HUB AND CABLE CLAMP.
2. FULL SIZE GROUNDING ELECTRODE CONDUCTOR IN PVC.
3. EXOTHERMICALLY WELDED (TYPICAL).
4. DRIVEN GROUND RODS ⅝"x8' COPPER/STEEL ON BUILDING EXTERIOR.
5. TABLE TAKEN FROM NEC 250.66. UNGROUNDED PHASE CONDUCTOR REFERS TO THE SIZE OF THE LARGEST UNGROUNDED SERVICE-ENTRANCE CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS. SEE NEC 250.66.
6. BOND METAL PIPING PER NEC 250.104.
7. REDUCED SIZE GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER PER NEC 250.66 (A) THROUGH (C). PROVIDE FULL SIZE CONDUCTOR IF CONDITIONS OF NEC 250.66 (A) THROUGH (C) ARE NOT MET.
8. WHEN PRESENT CONTRACTOR SHALL PROVIDE ALL GROUNDING MEANS INDICATED. CONTRACTOR SHALL REFER TO ELECTRICAL ONE-LINE DIAGRAM AND GROUNDING ELECTRODE CONDUCTOR SCHEDULE (THIS DETAIL) FOR GROUNDING ELECTRODE CONDUCTOR SIZE. CONTRACTOR SHALL REFER TO ELECTRICAL SPECIFICATIONS FOR SPECIFICS OF GROUNDING SYSTEM INSTALLATION AND MATERIALS.
9. GROUNDING ROD SHALL BE MIN. 9FT. AWAY FROM IRRIGATION CONTROLLER.
10. NFPA 10 6.5 PROHIBITS UNDERGROUND FIRE SPRINKLER PIPE FROM BEING USED AS GROUNDING ELECTRODE.
11. ONLY BOND SPLINKLER PIPE AND GAS PIPE TO GROUND BUS WHEN REQUIRED BY NFPA 780 FOR LIGHTNING PROTECTION OR WHEN LIKELY TO BECOME ENERGIZED PER SEE NEC 250.104 (B).



GROUNDING ELECTRODE CONDUCTOR (5)

UNGROUNDED PHASE CONDUCTOR (COPPER)	UNGROUNDED PHASE CONDUCTOR (ALUMINUM)	GRND WIRE SIZE (CU)
#2 OR SMALLER	1/0 OR SMALLER	#8
1 OR 1/0	2/0 OR 3/0	#6
2/0 OR 3/0	4/0 OR 250	#4
>3/0 THRU 350 KCMIL	>250 KCMIL THRU 500 KCMIL	#2
>350 KCMIL THRU 600 KCMIL	>500 KCMIL THRU 900 KCMIL	1/0
>600 KCMIL THRU 1100 KCMIL	>900 KCMIL THRU 1750 KCMIL	2/0
>1100 KCMIL	>1750 KCMIL	3/0

(1) SERVICE GROUNDING DETAIL

SCALE: NTS

Date: 11/14/22
Scale:

Date	Description	Revisions

BREINHOLT POWER ENGINEERING, PLLC

REGISTERED PROFESSIONAL ENGINEER 9857303-2202 KYLE L. BREINHOLT 3 January 2023 STATE OF UTAH

SERVICE GROUNDING DETAIL
WCWSID - EAST WELL
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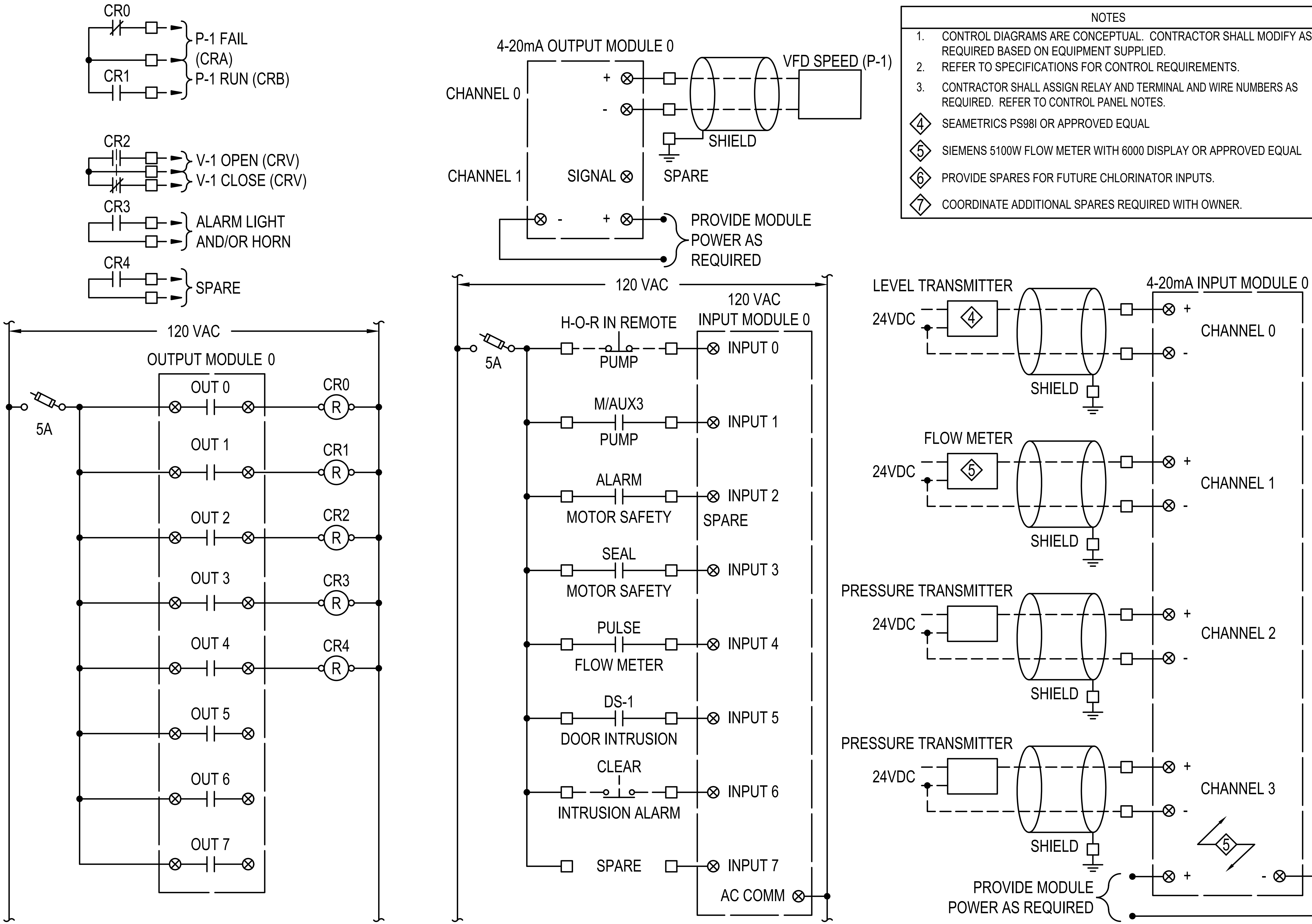

NOTES

1. CONTROL DIAGRAMS ARE CONCEPTUAL. CONTRACTOR SHALL MODIFY AS REQUIRED BASED ON EQUIPMENT SUPPLIED.
2. REFER TO SPECIFICATIONS FOR CONTROL REQUIREMENTS.
3. CONTRACTOR SHALL ASSIGN RELAY AND TERMINAL AND WIRE NUMBERS AS REQUIRED. REFER TO CONTROL PANEL NOTES.

- ⟨4⟩ SEAMETRICS PS98I OR APPROVED EQUAL
- ⟨5⟩ SIEMENS 5100W FLOW METER WITH 6000 DISPLAY OR APPROVED EQUAL
- ⟨6⟩ PROVIDE SPARES FOR FUTURE CHLORINATOR INPUTS.
- ⟨7⟩ COORDINATE ADDITIONAL SPARES REQUIRED WITH OWNER.

1 SERVICE GROUNDING DETAIL

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POWER ENGINEERING, PLLC

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REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
January 2023
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PLC WIRING DIAGRAMS
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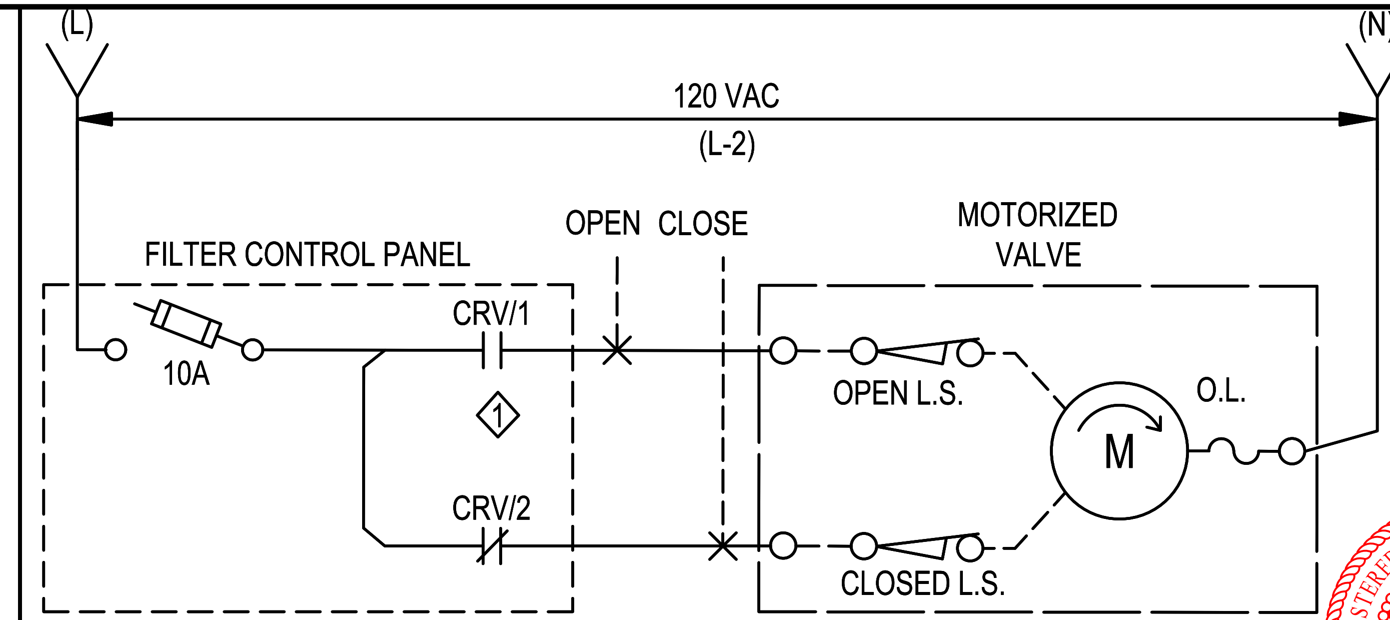
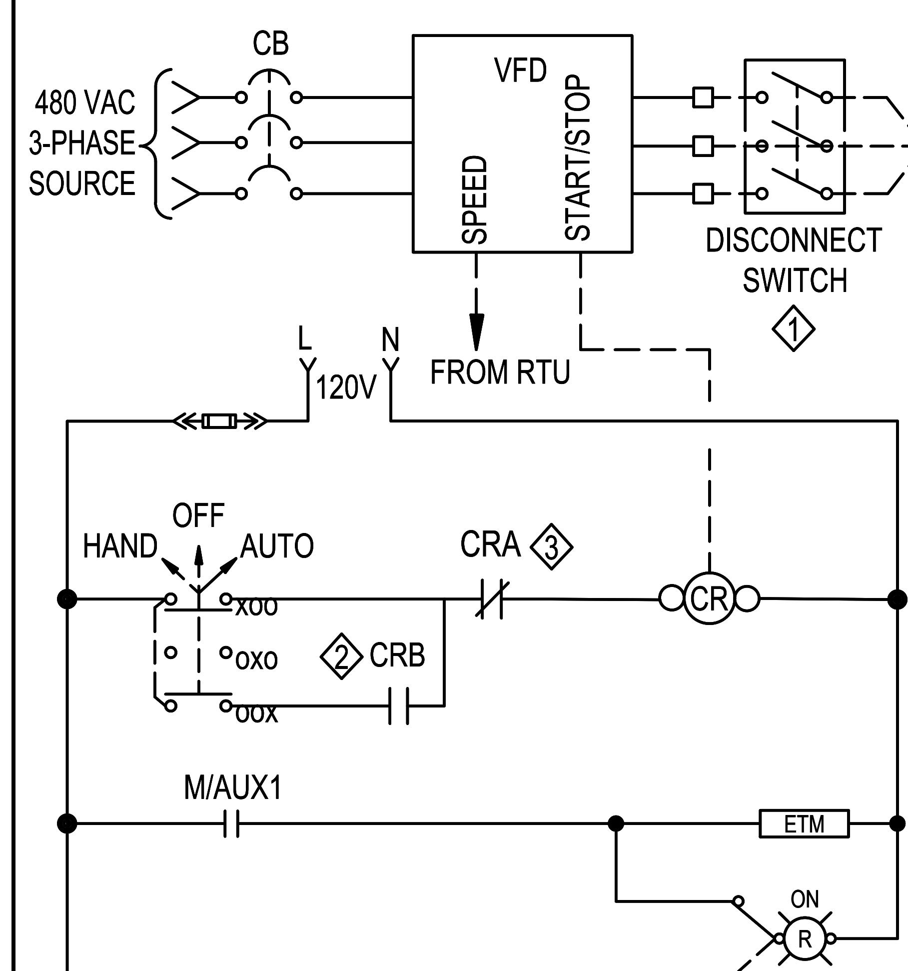


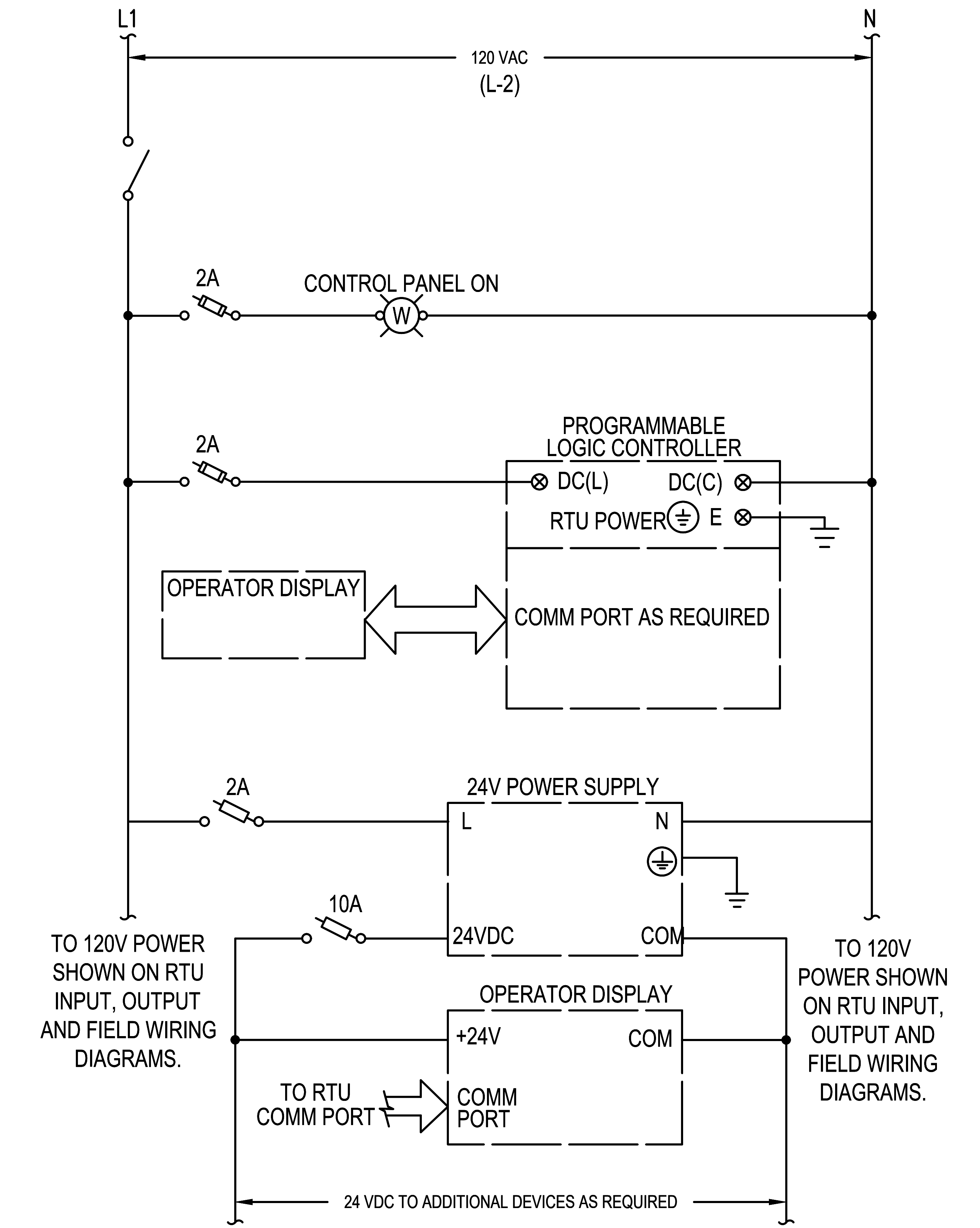
NOTES
◇1 RTU OUTPUT. SEE RTU WIRING DIAGRAMS FOR SIGNAL ORIGINATION.

① MOTORIZED VALVE CONTROL DIAGRAM



NOTES
◇1 FIELD MOUNTED NON-FUSED DISCONNECT SWITCH NOT REQUIRED FOR MOTORS WITHIN SIGHT OF MOTOR CONTROLLER. PROVIDE SWITCH FOR MOTORS NOT WITHIN SITE OF MOTOR CONTROLLER. REFER TO EQUIPMENT ROOM PLANS.
◇2 RTU CONTROLLED RELAY CRB IN CONTROL PANEL. CLOSES FOR NORMAL START, OPENS FOR NORMAL STOP.
◇3 RTU CONTROLLED INTERPOSE RELAY CRA IN CONTROL PANEL. OPENS TO STOP MOTOR (IE, SEAL FAIL, VIBRATION ALARM, MOTOR SAFETY).

② PUMP W/VFD & SHUT-DOWN CONTROL



③ CONTROL PANEL POWER & COMMUNICATION

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REGISTERED PROFESSIONAL ENGINEER
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KYLE L. BREINHOLT
3 January 2023
STATE OF UTAH

WIRING DIAGRAMS
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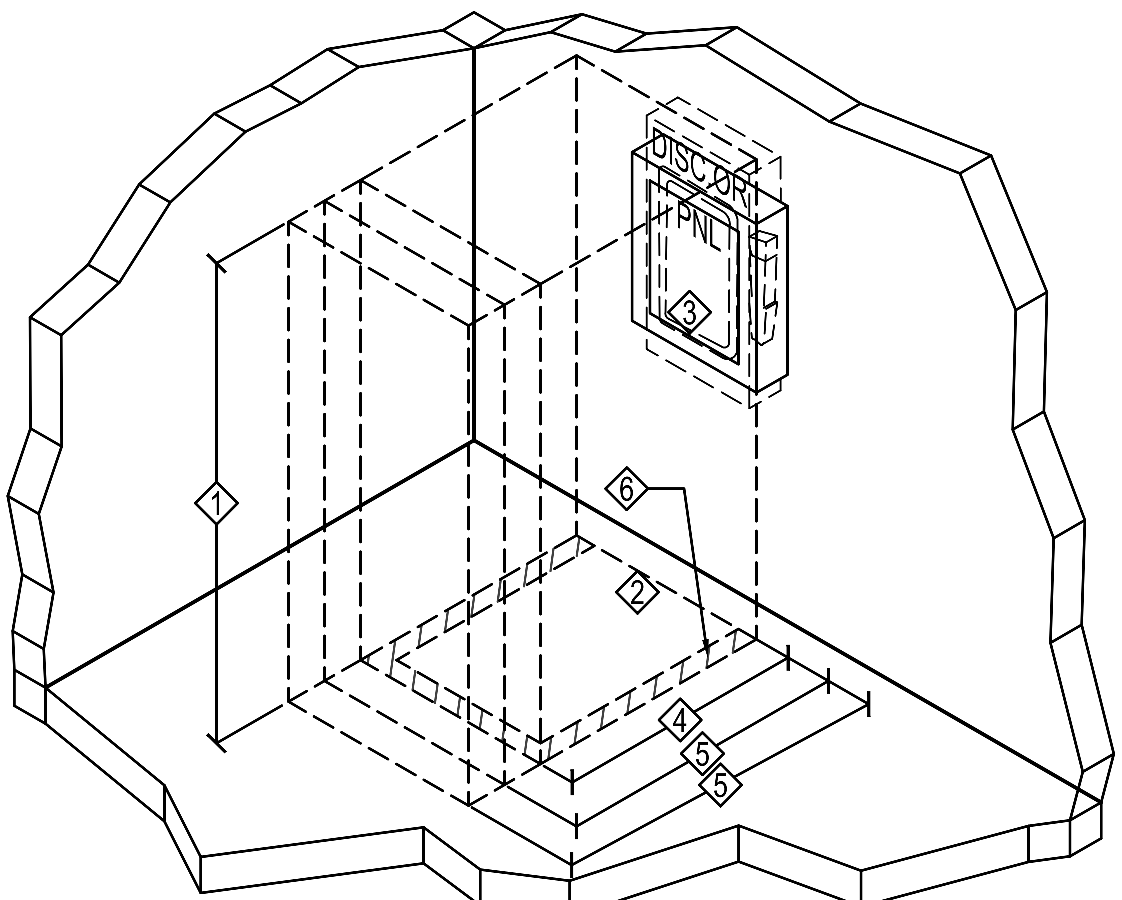
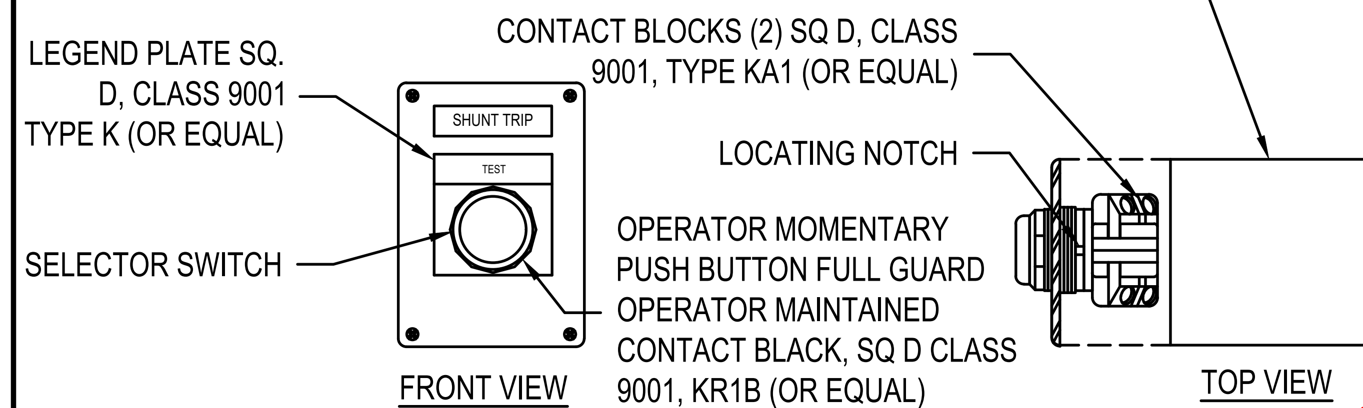
NOTES:

1. THE MINIMUM HEADROOM OF WORKING SPACE SHALL BE 6½ FT.
2. THE WIDTH OF THE WORKING SPACE SHALL BE THE WIDTH OF THE EQUIPMENT OR 30 IN., WHICHEVER IS GREATER. THE PANEL DOOR SHALL OPEN AT LEAST 90 DEGREES.
3. ALL CIRCUIT BREAKERS OR DISCONNECT HANDLES SHALL BE NOT MORE THAN 6 FT 7 IN. ABOVE THE FLOOR WHEN IN THEIR HIGHEST POSITION.
4. 3 FT CLEARANCE IF 0-150V TO GROUND.
5. 3.5FT CLEARANCE IF 151-600V TO GROUND. 4FT IF EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKING SPACE.
6. IN AREAS WHERE STORAGE IS LIKELY TO ENCROACH ON WORK SPACE CLEARANCE PROVIDE FLOOR MARKING TAPE, ON FINISHED FLOOR, FOR ELECTRICAL EQUIPMENT WORKING CLEARANCE IDENTIFICATION. FLOOR MARKING TAPE SHALL BE SELF-ADHESIVE VINYL OR POLYESTER TAPE WITH OVERLAMINATE, 3 INCHES (76MM) WIDE, WITH ALTERNATING BLACK AND WHITE STRIPES.
7. ALL WORKING SPACE CLEARANCE MEASURED FROM FACE OF PANEL FOR DEPTH, LEFT OR RIGHT EDGE FOR WIDTH, AND STANDING SURFACE FOR HEADROOM.
8. REFERENCE NEC 110.26 FOR WORKSPACE CLEARANCES.



③ ELECTRICAL WORK SPACE CLEARANCES

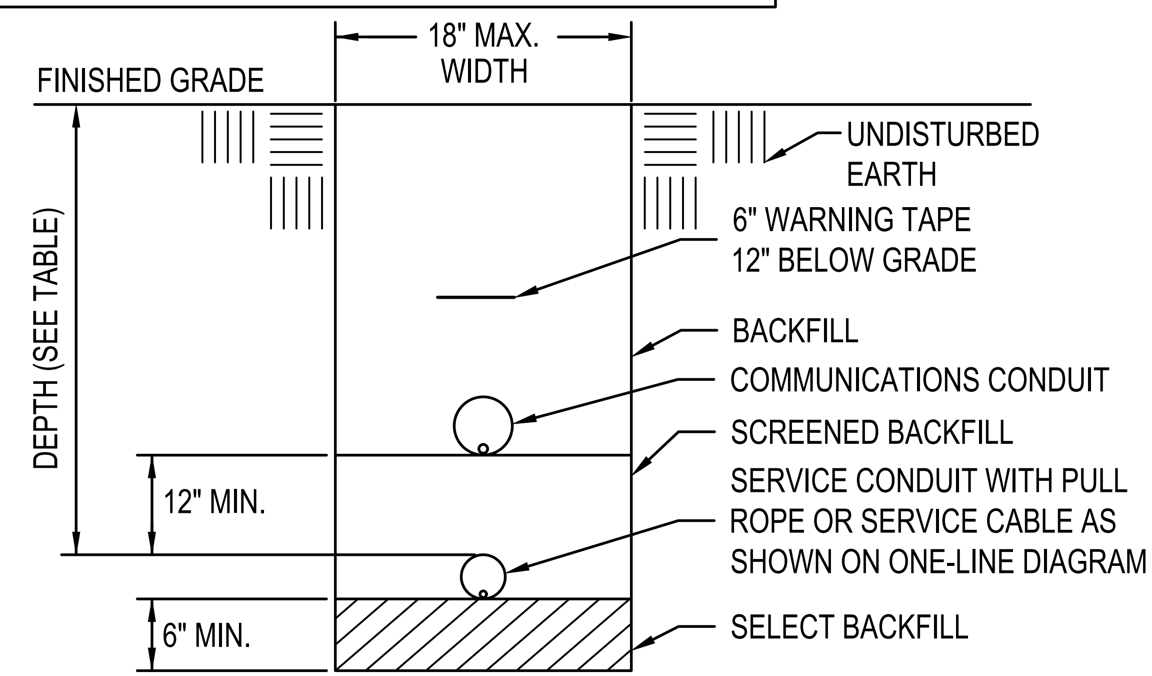
NOTES:
1. WHEN MOUNTED IN CONTROL PANEL, ENCLOSURE IS NOT REQUIRED.



① PUSH BUTTON

LOCATION DESCRIPTION	MIN. DEPTH
BELOW CONCRETE SLAB (NOT TRAFFIC)	18 INCHES
BELOW TRAFFIC SURFACES	24 INCHES
PARKING LOT (PAVED OR NON-PAVED)	24 INCHES
OTHER LOCATIONS	24 INCHES
UTILITY SECONDARY	24 INCHES*
UTILITY PRIMARY	48 INCHES*

(SEE NEC TABLE 300.5)
* VERIFY ALL DIMENSIONS WITH LOCAL POWER COMPANY STANDARDS AND SPECIFICATIONS.



② TRENCHING DETAIL

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REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
3 January 2023
STATE OF UTAH

DETAILS
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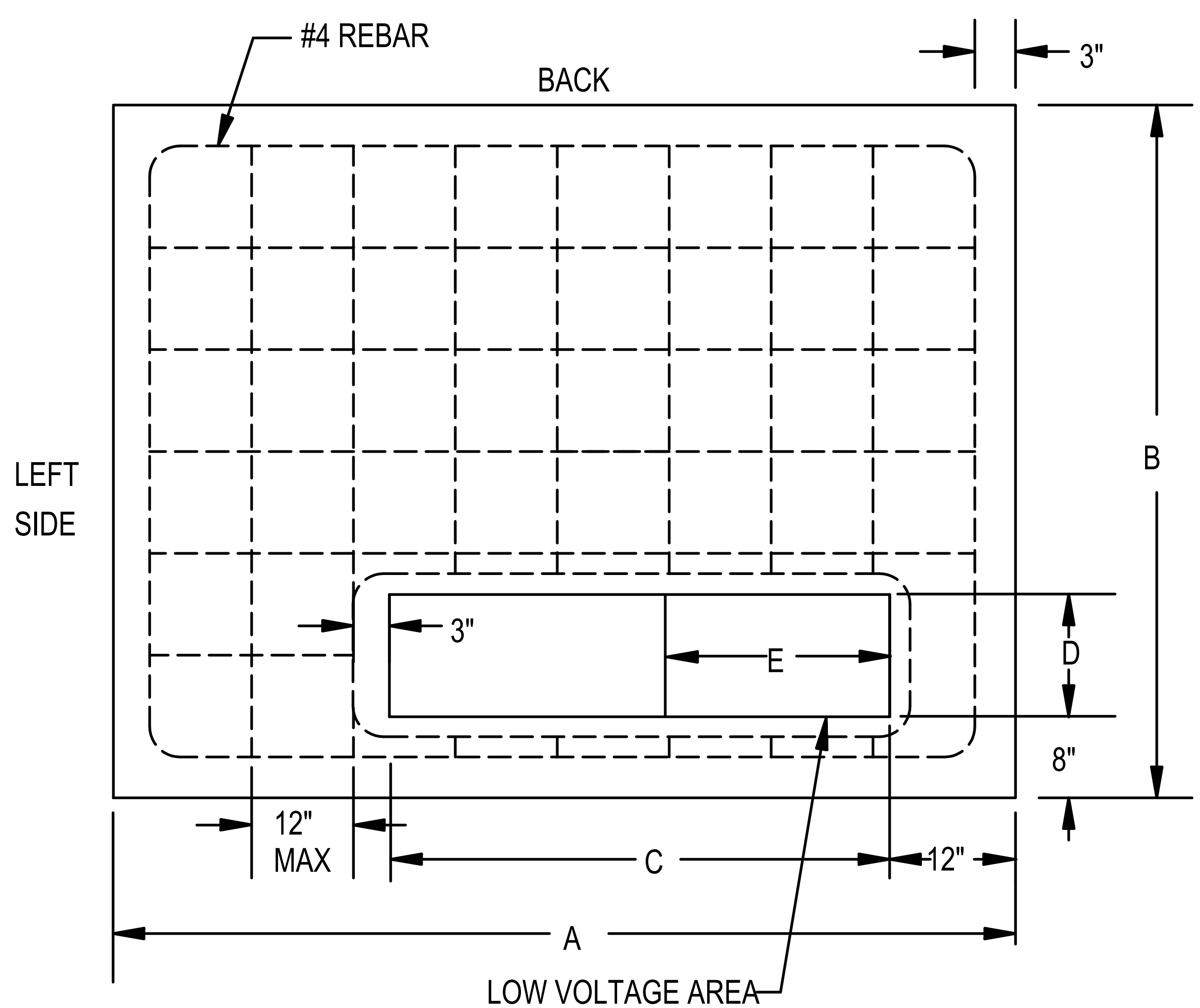
TRANSFORMER PAD DIMENSION CHART					
TRANSFORMER RATING	DIMENSIONS				
	A	B	C	D	E
75-500KVA	84"	78"	48"	15"	20"
750-2500KVA	96"	82"	60"	16"	30"



NOTES:

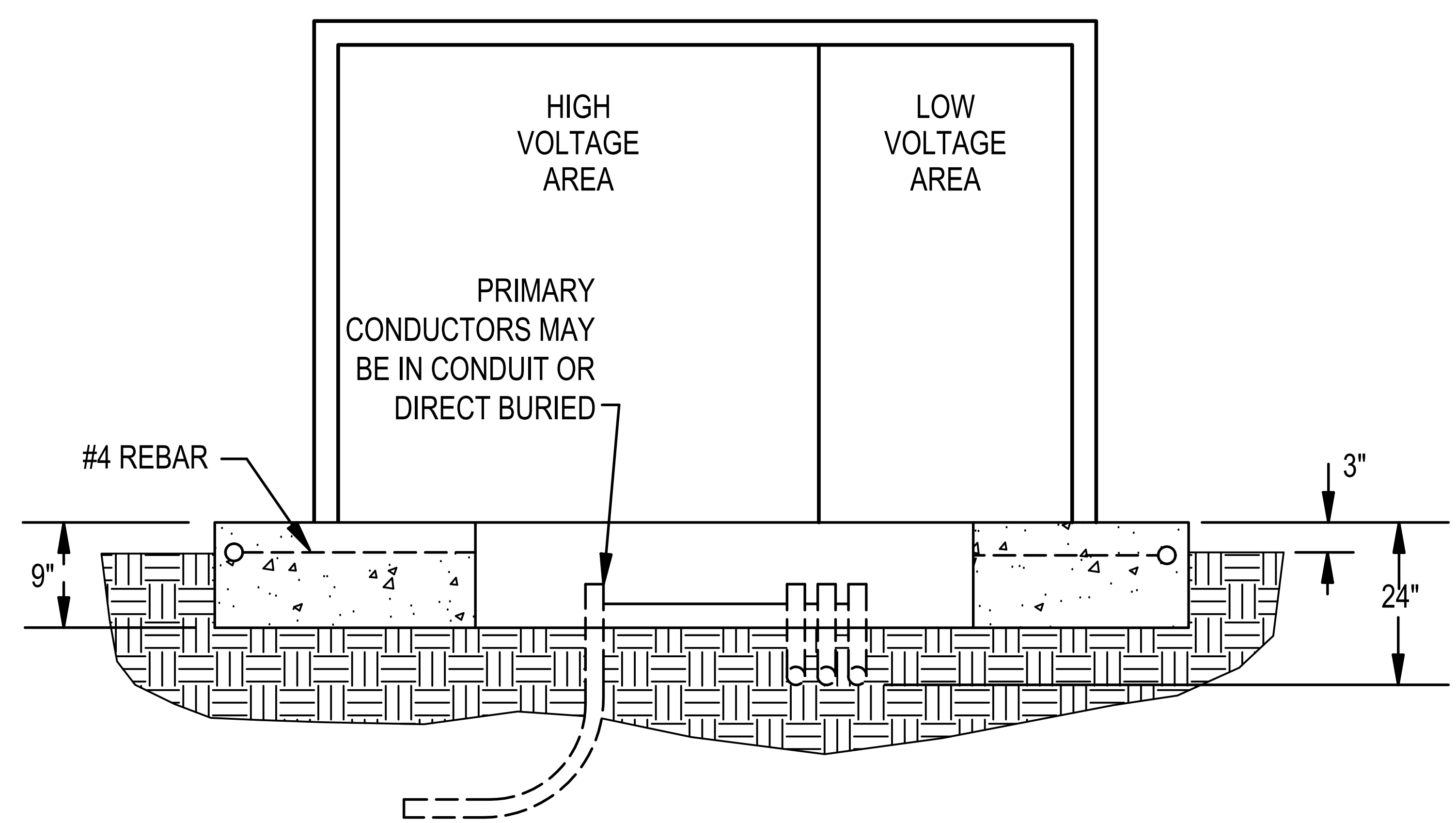
1. SITE PREPARATION: ALL DIRT BENEATH THE PAD SITE MUST BE COMPACTED AND LEVEL PRIOR TO SETTING OR POURING THE PAD TO PREVENT SETTLING.

2. CONCRETE: SHALL BE MADE USING A STANDARD BRAND OF PORTLAND CEMENT. STEEL REINFORCEMENT SHALL BE #4 REBAR PLACED ACCORDING TO THE DRAWINGS. THE PAD MUST BE POURED AT LEAST THREE FULL DAYS PRIOR TO SETTING THE UNIT. CONCRETE MUST BE KEPT ABOVE FREEZING AT LEAST 72 HOURS AFTER POURING. THE FINISHED SURFACE MUST BE COMPLETELY FLAT AND LEVEL. ALL WORK MUST BE DONE TO HIGH QUALITY STANDARDS.

3. PREFABRICATION: THE PAD MAY EITHER BE CONSTRUCTED ON THE SITE OR PREFABRICATED ACCORDING TO SPECIFICATIONS.

4. TRANSFORMER CONDUIT WINDOW LAYOUT: LOW VOLTAGE CONDUITS SHALL BE FORMED AS TIGHTLY AS POSSIBLE AGAINST RIGHT SIDE OF THE OPENING AND SHALL IN NO CASE EXTEND FURTHER THAN 16" FROM THE RIGHT SIDE OF CONDUIT WINDOW ON THE PAD. DO NOT PUT ANY CONCRETE IN OR UNDER THE CONDUIT WINDOW. USE DIRT TO SEPARATE CONDUITS. BELL ENDS ARE REQUIRED FOR ALL METAL CONDUITS BUT NOT FOR PLASTIC CONDUIT.

5. CLEARANCE: THE FRONT OF THE PAD SHOULD ALWAYS FACE AWAY FROM ADJACENT STRUCTURES AND BE FREE OF OBSTRUCTIONS. AT LEAST THREE FEET MUST SEPARATE THE EDGES OF THE PAD FROM ANY ADJACENT STRUCTURES. THE EDGES OF THE PAD MUST BE AT LEAST TEN FEET FROM ANY COMBUSTIBLE STRUCTURE. THE AREA IN FRONT OF THE PAD MUST HAVE TEN FEET OF CLEAR LEVEL WORKING AREA FOR MAINTENANCE OF THE UNIT.



① ROCKY MOUNTAIN POWER TRANSFORMER FLAT PAD

SCALE: NTS

DETAILS
WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

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BREINHOLT
POWER ENGINEERING, PLLC

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REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
January 2023
STATE OF UTAH

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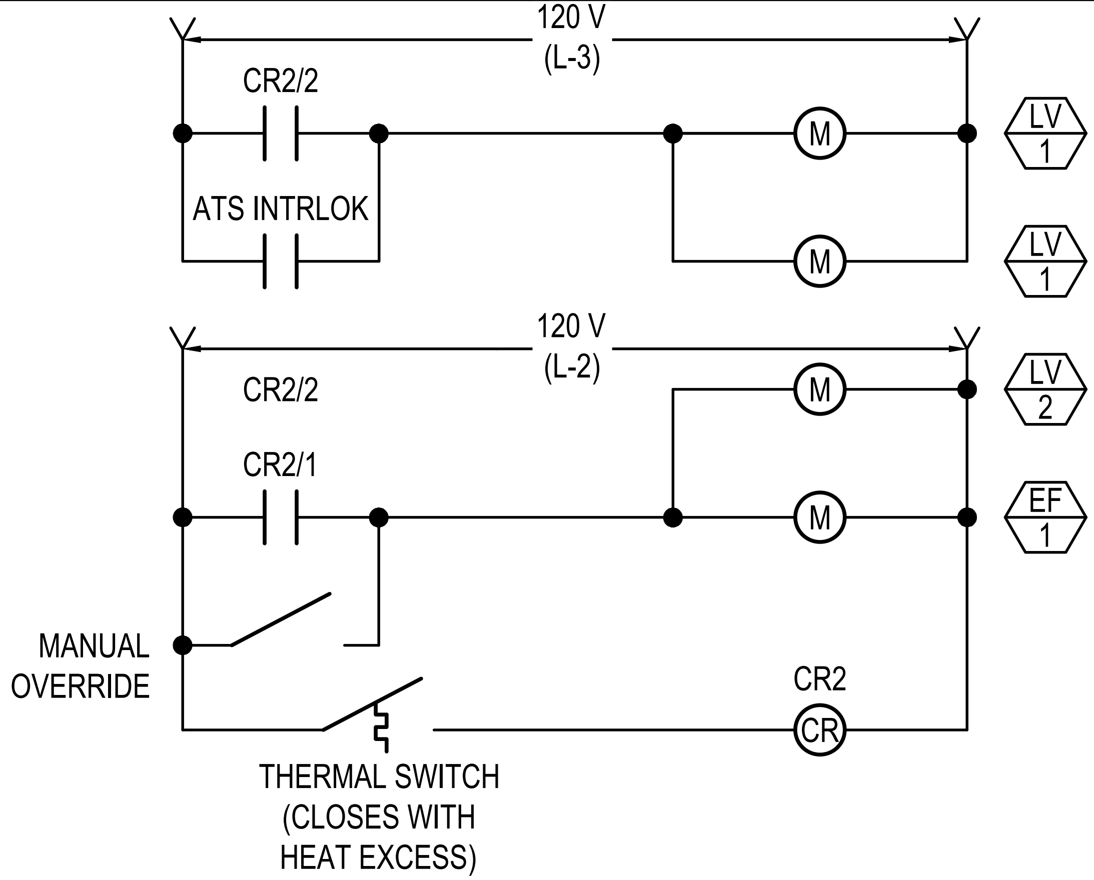
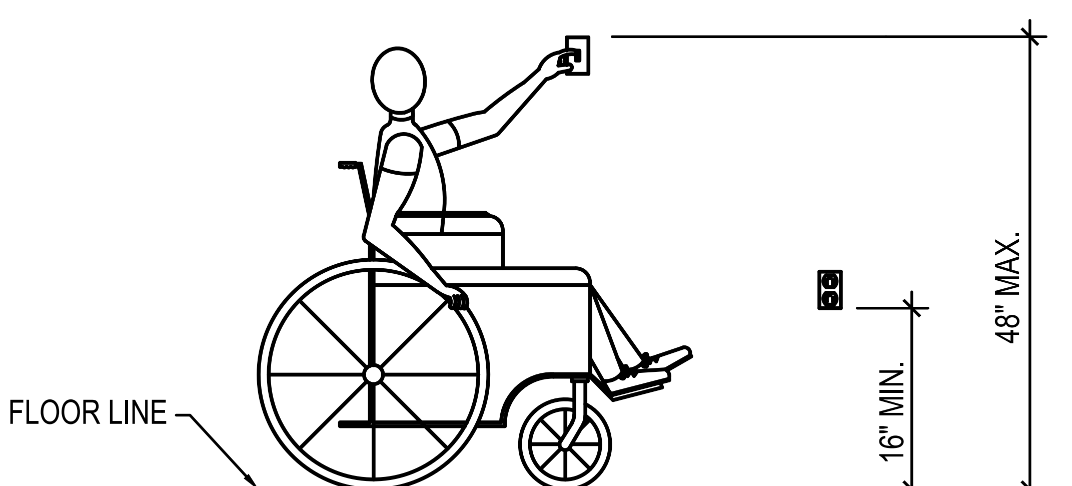
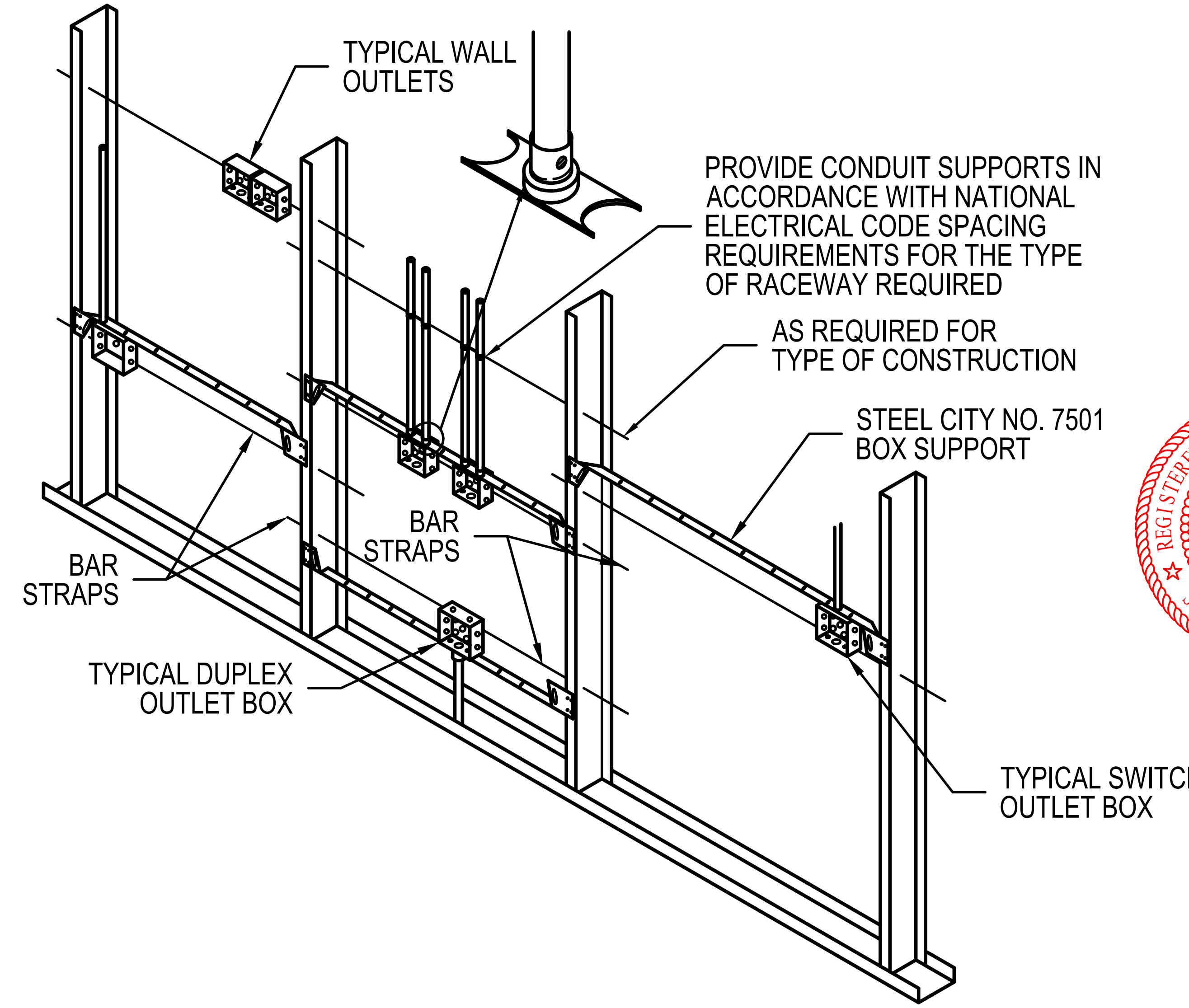


② EX FAN THERMOSTAT WIRING DIAGRAM



③ DEVICE MOUNTING HEIGHTS



GENERAL NOTES:

1. TYPICAL FOR WOOD & METAL STUD ROUGH-IN.
2. PLASTER RINGS NOT SHOWN.
3. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL, MECHANICAL DRAWINGS' AND ALL APPLICABLE SHOP DRAWINGS.
4. IN ACCORDANCE WITH IBC 711.3.2, OUTLETS ON OPPOSITE SIDES OF FIRE RATED WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY MINIMUM OF 24" HORIZONTAL DISTANCE.

① ROUGH-IN DETAIL FOR CONDUIT

Date: 11/14/22
Scale:

Date	Description

Revisions

BREINHOLT POWER ENGINEERING, PLLC

REGISTERED PROFESSIONAL ENGINEER
9857303-2202
KYLE L. BREINHOLT
3 January 2023
STATE OF UTAH

DETAILS

WCWSID - EAST WELL
5665 EAST ELK HORN DRIVE
EDEN, WEBER, UTAH

GARDNER ENGINEERING
CIVIL • LAND PLANNING
MUNICIPAL • LAND SURVEYING
5150 SOUTH 375 EAST OGDEN, UT
OFFICE: 801.476.0202 FAX: 801.476.0066

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INSTRUMENTATION

SYMBOL	DESCRIPTION
LEVEL	WELL LEVEL 1. PS98I TRANSMITTER 4-20MA 2. INSTALL IN SOUNDER TUBE JUST ABOVE THE PUMP DISCHARGE. 3. LENGTH OF CABLE AND RANGE DETERMINED BY CONTRACTOR PER WELL DEPTH & FIELD CONDITIONS
FLOW	FLOW METER 1. SIEMENS 5100W FLOW METER WITH 6000 DISPLAY. 2. 4-20MA OUTPUT & PULSE OUTPUT
DS	DOOR INTRUSION 1. MAGNETIC REED SWITCH 2. CONNECT DIRECTLY INTO MISSION REMOTE TELEMETRY UNIT. 3. LOCAL SUPPLIER, NO SPECIFIC BRAND OR MODEL. 4. COORDINATE NORMALLY OPEN OR NORMALLY CLOSED CONTACT WITH TELEMETRY PROGRAMMING
PRESSURE	LINE PRESSURE MONITORING 1. LOCAL SUPPLIER, NO SPECIFIC BRAND OR MODEL. 2. TRANSMITTER ONLY, NO DISPLAY REQUIRED. (MISSION RTU WILL DISPLAY PRESSURE ON LOCAL SCREEN)
VFD	VFD 1. DANFOSS VLT FC202 2. NO SUBSTITUTIONS, INDICATED MODEL HAS OWNER'S DESIRED THE PARAMETERS AND RAMP TIME. 3. PROVIDE LOAD SIDE WAVE FILTER AS REQUIRED FOR MOTOR PROTECTION AND TO MAINTAIN MOTOR WARRANTY. 4. PROGRAM AS DIRECTED BY OWNER.

EQUIPMENT SCHEDULE

SYMBOL	DESCRIPTION	SERVICE		DISCONNECT	STARTER	LOAD			REMARKS
		VOLTS	PHASE	SIZE		HP/TON	VA	AMPS	
EF 1	EXHAUST FAN	120 V	1Ø	NOTE E.	-	FRAC	240	2.0 A	
LVR 1	MOTORIZED LOUVER	120 V	1Ø	NOTE E.	-	FRAC	240	2.0 A	
LVR 2	MOTORIZED LOUVER	120 V	1Ø	NOTE E.	-	FRAC	240	2.0 A	
P-1	SUBMERSIBLE PUMP	480 V	3Ø	CIRCUIT BREAKER	VFD	30 HP	33,255	40.0 A	NOTE D.
UH 1	UNIT HEATER	120 V	1Ø	T-STAT	INTEGRAL	¼ HP	696	5.8 A	

NOTES:

A. VERIFY ALL EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS (i.e. VOLTAGE, PHASE, FLA, ETC.) WITH MECHANICAL DRAWINGS/SUBMITTALS BEFORE FOR ACTUAL EQUIPMENT INSTALLED.

B. ALL FUSES SHALL BE DUAL ELEMENT TIME DELAY. FINAL BREAKER/FUSE & DISCONNECT SIZE SHALL BE DETERMINED BY MANUFACTURER'S RECOMMENDATION FOR ACTUAL EQUIPMENT INSTALLED.

C. MAXIMUM VALUES INDICATED.

D. DISCONNECTING MEANS NOT REQUIRED FOR EQUIPMENT WITHIN SIGHT (AS DEFINED IN NEC) OF BRANCH PANEL SERVING EQUIPMENT. SEE NEC 422.31 (B).

E. DISCONNECTING MEANS NOT REQUIRED FOR APPLIANCES NOT OVER 300 VA. SEE NEC 422.31 (A).

LIGHT FIXTURE SCHEDULE

FIXTURE NUMBER	FIXTURE MANUFACTURER	FIXTURE CATALOG #	LAMPS		FIXTURE			DESCRIPTION	REMARKS
			TYPE	QTY.	VOLTS	WATTS	MOUNTING		
F1E	METALUX LITHONIA DAY-BRITE LSI COLUMBIA ORACLE ALPHALITE	4SNLED-LD4-30SL-LW-UNV-EL14W-L835-CD1-U ZL1N-L48-3000LM-FST-MVOLT-35K-80CRI-E7W-WH FSS440L835-UNV-DIM-EMLED SDL-4-LED-SS-WW-UE-EM LCL4-35LW-EDU-ELL14 4-OC1-LED-3000L-DIM10-MVOLT-35K-80-O-EMG-LED ILL-4-L(25S2)/8-35-EM1400	LED 3500 KELVIN 3000 LUMENS 80 CRI	INTEGRAL	277	29	SURFACE/CHAIN	48" LED STRIP WITH EMERGENCY BATTERY PACK	
F3	MCGRAW EDISON LITHONIA VISIONAIRE BROWNLEE HUBBELL ORACLE PARAFLEX	IST-F01-LED-E1-BL3-SCBA WST LED P1 30K VF MVOLT SCBA HEX-021-A-WW-MT-WPC 7037-C24LED-30K-CBA TRP1-12L-30-3K7-3-U-CBA OWP-FC-201-LED-2000L-MVOLT-30K-CBA DC150-90-24W-30K-FINISH	LED 3000 KELVIN 2200 LUMENS 80 CRI	INTEGRAL	277	27	SURFACE WALL	TRAPEZOID WALL SCONCE	COLOR TO BE SELECTED BY ARCHITECT. INSTALLATION SHALL COMPLY WITH WEBER COUNTY'S DARK SKY LIGHTING ORDINANCE.
EG	SURELITE LITHONIA EMERGENSEE LSI DUAL-LITE MAXILUME BLG	SELW25XX AFN-DB-EXT SEELEDEMDBEL-W-SDT-CW CSN-DB-CT PGZ-HTR ELM-807-BZ TRL-ACEM-FINISH-CL	6W XENON INCLUDED	2	277	12	SURFACE WALL	EMERGENCY EGRESS LIGHT	EMERGENCY EGRESS FINISH SELECTED BY ARCHITECT

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PANEL SCHEDULE "H"

VOLTAGE: 480 Y/ 277 VOLTS | BUS RATING (AMPS): 125 | REMARKS:

MOUNTING: SURFACE | PHASE: 3 | MAIN LUGS ONLY

ENCLOSURE: NEMA 1 | WIRE: 4 | MINIMUM EQUIPMENT RATING: 25,000 AMPS (RMS-SYM) AFC 22,784

CIRCUIT BREAKER				CIRCUIT NAME	FEEDER			CKT. LOAD		LOAD/PHASE (VA)			CKT. LOAD		FEEDER			CIRCUIT NAME	CIRCUIT BREAKER			
No.	AMPS	POLE	MOD.		C	WIRE	GRD	DEMAND FACTOR	WATTS	ØA	ØB	ØC	WATTS	DEMAND FACTOR	GRD	WIRE	C		MOD.	POLE	AMPS	No.
1	60	3	-	P-1 SUBMERSIBLE PUMP	1"	#6	#10	1.25	11,085	13,565			2,480	1.00	#12	#12	¾"	TRANSFOMER/PANEL L	-	3	20	2
3	-	-	-	-	-	#6	-	1.25	11,085		14,505		3,420	1.00	-	#12	-	-	-	-	-	4
5	-	-	-	-	-	#6	-	1.25	11,085			12,321	1,236	1.00	-	#12	-	-	-	-	-	6
7	20	1	-	LIGHT	¾"	#12	#12	1.00	153	153				1.00				SPACE	-			8
9			-	SPACE				1.00			0			1.00				SPACE	-			10
11			-	SPACE				1.00				0		1.00				SPACE	-			12

NOTES :

A. ALL INSULATION ON CONDUCTORS TO BE THHN UNLESS NOTED OTHERWISE. INSULATION ON ALL UNDERGROUND EXTERIOR CONDUCTORS SHALL BE THHW.

B. LOAD DEMANDS CALCULATED AS PER SECTIONS 210 & 220 OF THE NATIONAL ELECTRICAL CODE.

C. PANEL COVER SHALL BE FIELD MARKED FOR FLASH PROTECTION WITH A PERMANENT LABEL AS REQUIRED BY THE NATIONAL ELECTRICAL CODE SECTION 110. LABEL SHALL READ: "DANGER: POTENTIAL ARC FLASH HAZARD"

D. ABBREVIATIONS: CO-CONVENIENCE OUTLET, RR-RESTROOM, (N)ORTH, (S)OUTH, (E)AST, (W)EST.

ØA	ØB	ØC	TOTALS	
13,718	14,505	12,321	40,544	CONNECTED LOAD (VA)
			49	CONNECTED LOAD (A)
2,771	2,771	2,771	8,314	DEMAND FACTOR ADJUSTMENTS (VA)
16,489	17,276	15,092	48,858	TOTAL LOAD (VA)
60	62	54		TOTAL LOAD (A)
			62	MAXIMUM LOAD (A)
34%	35%	31%		PHASE BALANCE

PANEL SCHEDULE "L"

VOLTAGE: 208 Y/ 120 VOLTS | BUS RATING (AMPS): 100 | REMARKS:

MOUNTING: SURFACE | PHASE: 3 | MAIN CIRCUIT BREAKER: 45

ENCLOSURE: NEMA 1 | WIRE: 4 | MINIMUM EQUIPMENT RATING: 22,000 AMPS (RMS-SYM) AFC 21,653

CIRCUIT BREAKER				CIRCUIT NAME	FEEDER			CKT. LOAD		LOAD/PHASE (VA)			CKT. LOAD		FEEDER			CIRCUIT NAME	CIRCUIT BREAKER			
No.	AMPS	POLE	MOD.		C	WIRE	GRD	DEMAND FACTOR	WATTS	ØA	ØB	ØC	WATTS	DEMAND FACTOR	GRD	WIRE	C		MOD.	POLE	AMPS	No.
1	20	1	-	EF-1 EXHAUST FAN & LVR-2 MOT	¾"	#12	#12	1.00	480	980			500	1.00	#12	#12	¾"	CONTROL POWER	-	1	20	2
3	20	1	-	(2) LVR-1 MOTORIZED LOUVER	¾"	#12	#12	1.00	480		1,920		1,440	1.00	#12	#12	¾"	CO - INTERIOR	GFCI	1	20	4
5	20	1	-	UH-1 UNIT HEATER	¾"	#12	#12	1.00	696			1,236	540	1.00	#12	#12	¾"	CO - EXTERIOR	GFCI	1	20	6
7	20	1	-	GENERATOR BLOCK HEATER	¾"	#12	#12	1.00	1,500	1,500				1.00				SPACE	-			8
9	20	1	-	GENERATOR BATTERY CHARGER	¾"	#12	#12	1.00	1,500		1,500			1.00				SPACE	-			10
11			-	SPACE				1.00				0		1.00				SPACE	-			12

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D. ABBREVIATIONS: CO-CONVENIENCE OUTLET, RR-RESTROOM, (N)ORTH, (S)OUTH, (E)AST, (W)EST.

ØA	ØB	ØC	TOTALS	
2,480	3,420	1,236	7,136	CONNECTED LOAD (VA)
			20	CONNECTED LOAD (A)
0	0	0	0	DEMAND FACTOR ADJUSTMENTS (VA)
2,480	3,420	1,236	7,136	TOTAL LOAD (VA)
21	28	10		TOTAL LOAD (A)
			28	MAXIMUM LOAD (A)
35%	48%	17%		PHASE BALANCE

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