| | |
|---|---|
| | RECESSED 1X4 LUMINAIRE |
| | SURFACE MOUNTED 1X4 LUMINAIRE |
| | RECESSED 2X2 LUMINAIRE |
| | SURFACE MOUNTED 2X2 LUMINAIRE |
| | SHADING OF ANY LUMINAIRE INDICATES CONNECTION TO ALTERNATE POWER SOURCE (EMERGENCY, UPS, STANDBY, ETC.) PER CIRCUITING INDICATED |
| | SUSPENDED LINEAR LUMINAIRE (SIZE VARIES) |
| | WALL MOUNTED LINEAR LUMINAIRE (SIZE VARIES) |
| | SUSPENDED PENDANT LUMINAIRE (SIZE VARIES) |
| | RECESSED DOWNLIGHT, CEILING MOUNTED |
| | SURFACE DOWNLIGHT, CEILING MOUNTED |
| | RECESSED WALLWASH |
| | SURFACE WALLWASH |
| | RECESSED LINEAR WALLWASH |
| | SURFACE LINEAR WALLWASH |
| | RECESSED WALL MOUNTED LUMINAIRE |
| | TRACK LIGHTING WITH HEADS AS INDICATED. |
| | RECESSED CEILING ADJUSTABLE POINT SOURCE |
| | SURFACE CEILING ADJUSTABLE POINT SOURCE |
| | WALL MOUNTED LUMINAIRE |
| | WALL MOUNTED DIRECTIONAL (SIZE VARIES) |
| | FLUORESCENT STRIPLIGHT – POWER FEED SECTION, FEED THROUGH SECTION. LENGTH AS SHOWN. |
| | WALL MOUNTED FLUORESCENT STRIPLIGHT |
| | UNDERCABINET FLUORESCENT STRIPLIGHT |
| | CONTINUOUS LINEAR SOURCE (LED, COLD CATHODE, NEON, FIBER OPTIC, ETC...) |
| | BATTERY POWER EMERGENCY UNIT EQUIPMENT (SEE LUMINAIRE SCHEDULE FOR QUANTITY OF HEADS) – WALL, CEILING MOUNTED. |
| | ILLUMINATED EXIT SIGN, SHADED QUADRANT INDICATES FACES, ARROWS AS SHOWN |
| | BOLLARD |
| | POLE MOUNTED LUMINAIRE– SINGLE OR DUAL HEAD |
| | INDICATES ROTATED OPTICS |
| | POST TOP MOUNTED LUMINAIRE |
| | IN–GRADE POINT SOURCE |
| | GARAGE LIGHTING LUMINAIRE WITH CUTOFF LOUVERS |
| | LUMINAIRE MARKING CONVENTION LEGEND:<br>HA = LUMINAIRE TYPE IDENTIFICATION. SEE LUMINAIRE SCHEDULE.<br>3c = CIRCUIT NUMBER VIA LOCAL SWITCH (LOWERCASE LETTER) THAT SERVES THE LUMINIARE.<br>3A = CIRCUIT NUMBER/UPPERCASE LETTER COMBINATION INDICATES LOW VOLTAGE RELAY OR LIGHTING CONTACTOR THAT SERVES THE LUMINAIRE |

## SWITCHING CONTROLS

| | |
|---|---|
| | SINGLE POLE SWITCH (SUPERSCRIPT DENOTES SIMILARLY MARKED LUMINAIRES CONTROLLED TOGETHER) |
| | TWO POLE SWITCH |
| | THREE WAY SWITCH |
| | FOUR WAY SWITCH |
| | KEY OPERATED SWITCH |
| | DIMMER SWITCH. NUMBER INDICATES WATTAGE RATING. IF NOT SHOWN THEN EQUAL TO LOAD. |
| | DIMMER SWITCH UNDER SEPARATE COVERPLATE |
| | SWITCH WITH PILOT LIGHT (PILOT IS "ON WHEN SWITCH IS "ON"). |
| | SWITCH WITH PILOT LIGHT (PILOT IS "ON WHEN SWITCH IS "OFF"). |
| | TIMER SWITCH |
| | LOW VOLTAGE MOMENTARY CONTACT SWITCH, UPPER CASE LETTER SUPERSCRIPT INDICATES CONNECTION TO LOW VOLTAGE RELAY CONTROLLING SIMILARLY MARKED LUMINAIRES. |
| | EXPLOSION PROOF SWITCH |
| | WEATHERPROOF SWITCH |
| | LINE VOLTAGE, VARIABLE SPEED FAN CONTROL SWITCH, PROVIDED BY DIV. 15, INSTALLED BY DIV. 16. LOCATE ADJACENT TO ADJACENT TO LIGHT SWITCHES. |
| | MOTOR–RATED THERMAL OVERLOAD SWITCH |
| | LIGHTING CONTROL OVERIDE SWITCH, SEQ. NUMBER |
| | PHOTOCELL |
| | EQUIPMENT OPERATOR PUSH BUTTON STATION. PROVIDED WITH EQUIPMENT, INSTALLED AND CONNECTED BY DIV. 16, UON. |
| | PUSHBUTTON OR PUSHBUTTONS, BY DIV. 16 |
| | TIME CLOCK |
| | OCCUPANCY SENSOR – WALL MOUNTED |
| | 360 DEGREE OCCUPANCY SENSOR – CEILING MTD. |
| | 180 DEGREE OCCUPANCY SENSOR – CEILING MTD. |
| | CORRIDOR/AISLE OCCUPANCY SENSOR – CEILING MOUNTED |

| | |
|---|---|
| | TRANSFORMER WITH CODE CLEARANCES SHOWN |
| | SERVICE AND/OR DISTRIBUTION EQUIPMENT WITH CODE CLEARANCES SHOWN |
| | CONNECTION TO MOTOR PROVIDED BY OTHERS |
| VFD | CONNECTION TO DIV. 15 FURNISHED VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONNECT DIV. 16 TO INSTALL VFD EQUIPMENT |
| | DISCONNECT SWITCH, SIZE AS NOTED OR IF NOT SHOWN SIZE PER CONNECTED MOTOR SIZE AND MOTOR DISCONNECT SCHEDULE |
| F | FUSED DISCONNECT SWITCH, SIZE AS NOTED. SIZE FUSE PER MANUFACTURER'S RECOMMENDATIONS |
| C | ENCLOSED CIRCUIT BREAKER DISCONNECT SWITCH, TRIP SIZE AS NOTED. |
| | DISCONNECT W/ MAGNETIC MOTOR STARTER (CONTROLLER) OR CONTACTOR. SIZE PER LOAD SERVED. NEMA SIZE #1 MINIMUM. |
| | MAGNETIC MOTOR STARTER (CONTROLLER) OR CONTACTOR. SIZE PER LOAD SERVED. NEMA SIZE #1 MINIMUM. |
| | DIV. 16 CONNECTION TO EQUIPMENT PROVIDED BY OTHERS. SHADED = ON ALT. POWER SOURCE NOTED |
| | DIV. 16 CONNECTION TO EQUIPMENT WITH INTEGRAL DISCONNECT THAT IS PROVIDED BY OTHERS. SHADED = ON ALT. POWER SOURCE NOTED |
| | EQUIPMENT OR TERMINAL ENCLOSURE AS NOTED, SURFACE AND RECESS MOUNTED |
| | BUILDING GROUND BUS, SEE DETAILS |
| DM | DAMPER MOTOR |
| | BUSWAY RISER |
| C F | BUSWAY STAB–IN TYPE CIRCUIT BREAKER OR FUSE DISCONNECT. SIZE AS NOTED. |

## DIAGRAMS

| SYMBOL | DESCRIPTION |
|---|---|
| | HAND/OFF/AUTO SWITCH |
| | SWITCH |
| | FIELD INSTALLED CONTROL CIRCUIT WIRING TO DESTINATION SHOWN, U.O.N. |
| | OVERLOADS |
| | NORMALLY CLOSED CONTACTOR OR RELAY CONTACTS |
| | NORMALLY OPEN CONTACTOR OR RELAY CONTACTS |
| | BUS DUCT |
| | BUS BAR |
| | BATTERY GENERAL |
| | RESISTOR |
| | CONNECTOR, FEMALE AND MALE RESPECTIVELY |
| | PIPE GROUND |
| C | CONTACTOR COIL |
| R | RELAY COIL |
| D | LIGHTNING SURGE ARRESTOR D= DISTRIBUTION CLASS I = INTERMEDIATE CLASS |
| TVSS | TRANSIENT VOLTAGE SURGE SUPPRESSOR |
| | CURRENT TRANSFORMER |
| | POTENTIAL TRANSFORMER |
| | NORMALLY OPEN PUSH BUTTON |
| | NORMALLY CLOSED PUSH BUTTON |
| | FUSED VOLTAGE SENSE LEADS |
| PF | METER: POWER FACTOR |
| KWH | METER: KILOWATT HOUR |
| M M | UTILITY CO. APPROVED SOCKET WITH METER INSTALLED. SQUARE = REMOTE MOUNTED |
| DMU | DIGITAL METER UNIT. REFER TO SPECIFICATIONS. |
| STB | CURRENT TRANSFORMER SHORTING TERMINAL BLOCK. |
| | TERMINAL FOR FIELD CONNECT, SIZE & TYPE SUITABLE FOR CONDUCTOR INSTALLED. |
| | LED INDICATOR LIGHT, PUSH TO TEST, R=RED G= GREEN, B= BLUE, Y= YELLOW, W= WHITE |
| | DELTA CONNECTION |
| | GROUNDED WYE CONNECTION |
| | CONNECTION TO GROUND |
| 100AT 225AF | CIRCUIT BREAKER, WITH TRIP & FRAME AMPERE RATING |
| 225AF 400AS | FUSED SWITCH, WITH FUSE AND SWITCH AMPERE RATING |
| | INDIVIDUALLY MOUNTED CIRCUIT BREAKER |
| 52 | CIRCUIT BREAKER, MEDIUM VOLTAGE, DRAWOUT |
| | DRAWOUT CIRCUIT BREAKER |
| GF | GROUND FAULT TRIP UNIT |
| BA | BELL ALARM TRIP MODULE CONTACTS |
| ST | SHUNT TRIP UNIT, 120VAC OR VOLTAGE AS NOTED |
| CM | MONITORING COMMUNICATION MODULE |
| AM | INTEGRAL AMMETER DISPLAY |

| | |
|---|---|
| L5–15R | SPECIAL PURPOSE RECEPTACLE –WALL, CEILING ON ALT. POWER; NEMA CONFIGURATION AS NOTED |
| AB | RECEPTACLE TYPE SHOWN –WALL –ABOVE COUNTER BACKSPLASH. SEE ARCHITECTURAL DRAWINGS. |
| "ON ALT." | SHADED RECEPTACLES NOTED "ON ALT." ABOVE ARE CONNECTED TO ALTERNATE POWER SOURCE (EMERG., STANDBY, UPS, ETC.) PER CIRCUITING INDICATED |
| | DUPLEX RECEPTACLE – WALL – HALF SWITCHED |
| | COMBINATION SWITCH/DUPLEX RECEPTACLE |
| GFI | DUPLEX RECEPTACLE – WALL – WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER |
| WP | RECEPT. TYPE SHOWN W/ WEATHERPROOF COVER AND INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER |
| +42" | RECEPT. TYPE SHOWN AT SPECIAL HEIGHT |
| | WALL MOUNTED ELECTRICAL CONNECTION TO ELECTRIFIED FURNITURE. PROVIDE 8 WIRES (4 HOTS, 1 DEDICATED NEUTRAL, 1 COMMON NEUTRAL, 1 ISOLATED GROUND) NEUTRALS TO BE #10 AWG. USE LIQUID–TIGHT FLEX. |
| | CLOCK HANGER RECEPTACLE |
| | FLUSH FLOOR BOX DEVICE – DEVICE TYPE PER SYMBOLS ABOVE |
| | PEDESTAL FLOOR DEVICE – DEVICE TYPE PER SYMBOLS ABOVE |
| | POKE THRU UNIT WITH DUPLEX RECEPTACLE – FLUSH, PEDESTAL MOUNTED. |
| | POKE THRU UNIT WITH DOUBLE DUPLEX RECEPTACLE – FLUSH, PEDESTAL MOUNTED. |
| | COMBO POKE THRU UNIT WITH DUPLEX RECEPTACLE AND TELEPHONE OUTLET – FLUSH, PEDESTAL MOUNTED. |
| | MULTI–SERVICE FLOOR BOX CAST IN CONC. OR IN RAISED FLOOR – SEE ARCH DWGS; WITH RECEPTACLES & SIGNAL OUTLETS AS NOTED. |
| J | POKE THRU UNIT WITH JUNCTION BOX. RACEWAY COMPONENTS RC–700 SERIES. |
| | TELE/POWER POLE, POWER POLE |
| | TELE/POWER POLE WITH WHIP CONNECTION TO ELECTRIFIED FURNITURE |
| J | TWO–PIECE SURFACE METAL RACEWAY WITH RECEPTACLES AS NOTED, LENGTH AS INDICATED ON THE DRAWINGS AND WITH ALL FITTINGS AS REQUIRED. |
| J | TWO OR THREE COMPARTMENT SURFACE METAL RACEWAY WITH RECEPTACLES AND OUTLETS AS INDICATED, LENGTH AS INDICATED ON THE DRAWINGS. PROVIDE ALL FITTINGS AS REQUIRED. |

| | |
|---|---|
| 1 E4.1 | REFER TO DOUBLE NO. ON DRAWING INDICATED NOT ALL DETAIL REFERENCES ARE SHOWN. ALL DETAILS APPLY TO ALL APPLICABLE SITUATIONS, UON. |
| 2 E4.1 | ELEVATION TAG: REFER TO ELEVATION NUMBER ON DRAWING INDICATED |
| 2 E4.1 | SECTION TAG: REFER TO SECTION NUMBER ON DRAWING INDICATED |
| K112 | KITCHEN EQUIPMENT REFERENCE, REFER TO KITCHEN EQUIPMENT SCHEDULE |
| CH 1 | MECHANICAL EQUIPMENT IDENTIFICATION TAG |
| EQUIP NAME | EQUIPMENT BY OTHERS IDENTIFICATION TAG |

## WIRING

| SYMBOL | DESCRIPTION |
|---|---|
| | WIRING CONCEALED IN CEILING OR WALL. LINE WEIGHT TOP TO BOTTOM= NEW, EXISTING TO REMAIN, FUTURE |
| | WIRING CONCEALED IN FLOOR OR UNDER GRADE OR ROUTED IN CEILING SPACE OF FLOOR BELOW. LINE WEIGHT TOP TO BOTTOM= NEW, EXISTING TO REMAIN, FUTURE |
| | EXISTING WIRING TO BE REMOVED |
| T | TELEPHONE SYSTEM CONDUIT |
| MV | MEDIUM VOLTAGE CONDUIT |
| G | BARE GROUNDING GRID OR CONDUCTORS, UON. |
| GC | GROUNDING CONDUCTOR(S) ROUTED IN CODE SIZED CONDUIT, UON. |
| | STROKES INDICATE QUANTITY OF #12 AWG. CONDUCTORS, UON. NOTE: WIRING STROKES FOR 20A BRANCH CIRCUITS ARE NOT SHOWN ON DRAWINGS. CONTRACTOR SHALL USE INFORMATION IN PANEL AND BRANCH CIRCUIT SCHEDULES TO PROVIDE REQUIRED CIRCUITING. |
| | GROUND |
| | HOT NEUTRAL |
| L1A–1,3 HD1A | HOME RUN WIRING TO INDICATED DESTINATION, 3/4"C. MIN. OR AS OTHERWISE NOTED. CONTRACTOR SHALL USE CIRCUIT SIZES NOTED IN RESPECTIVE SCHEDULES AND INFORMATION IN THE FEEDER AND BRANCH CIRCUIT SCHEDULES. |
| | CONDUIT RUN TURNED UP THROUGH FLOOR OR CEILING. CORE & FIREPROOF AS REQUIRED. |
| | CONDUIT RUN TURNED DOWN THROUGH FLOOR OR CEILING. CORE & FIREPROOF AS REQUIRED. |
| | CONDUIT STUBBED OUT AT LOCATION SHOWN. PROVIDE INSULATED BUSHING & PULLROPE. |
| | TELEPHONE/DATA SLEEVE THROUGH WALL, ABOVE CEILING. EXTEND TO ACCESSIBLE TILE CLG. BOTH SIDES. TERMINATE WITH BUSHINGS. (1) 1.25" CO UON. COORDINATE LOCATIONS WITH CABLE INSTALLER(S) PRIOR TO ROUGH–IN. |
| | BASKET TYPE CABLE TRAY WITH 90 DEGREE ELBOW SHOWN |
| | LADDER TYPE CABLE TRAY WITH 90 DEGREE ELBOW SHOWN |
| | JUNCTION BOXES, WALL, CEILING AND FLUSH FLOOR MOUNTED. 4" SQ. BOX MIN., LARGER IF REQUIRED |
| | WIRING EXTENSION POINT – CONDUIT TO MC CABLE OR MANUFACTURED WIRING SYSTEM J–BOX ABOVE ACCESSIBLE CEILINGS AREAS, OR EXTEND CONDUIT & WIRE IN EXPOSED OR "HARD" CEILING AREAS. SHADED= ON ALT. POWER SOURCE (EMERG,UPS,ETC.) |
| PB | PULL BOX, MIN. SIZE PER NEC., UON. |
| | UNDERFLOOR RACEWAY |
| | FLEXIBLE CONDUIT CONNECTION |
| | POWER CONNECTION TO DIV 15 FIRE/SMOKE DAMPER. REFER TO FSD CONNECTION DETAIL IF NOT SHOWN |

## SIGNAL DEVICES

| SYMBOL | DESCRIPTION |
|---|---|
| | TERMINAL/MOUNTING BOARD, 8' HIGH X WIDTH AS SHOWN, FIRE TREATED. |
| | SIGNAL SYSTEM EQUIPMENT ENCLOSURES AS NOTED– SURFACE, RECESSED MOUNTED |
| | COMBO TELEPHONE/DATA OUTLET – WALL |
| W | TELEPHONE OUTLET – WALL, W = USE HIGHER MOUNTING HEIGHT PER MOUNTING HT. DETAIL |
| | DATA OUTLET – WALL |
| S S | SPEAKER – WALL, CEILING |
| V | VOLUME CONTROL – WALL |
| B | BELL |
| | BUZZER |
| | CHIME |
| C C | SYSTEM CLOCK – WALL , CEILING |
| M | INTERCOM STATION – WALL, DESK M = MASTER STATION |
| M M | MICROPHONE JACK – WALL, FLOOR |
| | PUSHBUTTON OR PUSHBUTTONS |
| | RF COAX CABLE OUTLET (TV, VCR, ETC.) |
| | COMBINATION RF COAX CABLE AND DATA OUTLET |
| | RF COAX CABLE SIGNAL SPLITTER |
| | RF COAX CABLE DISTRIBUTION AMPLIFIER. PROVIDE 120V POWER AS REQUIRED OR AS INDICATED. SEE RISER DIAGRAM. |
| | FLUSH FLOOR DEVICE – DEVICE TYPE PER SYMBOLS ABOVE |
| | PEDESTAL FLOOR DEVICE – DEVICE TYPE PER SYMBOLS ABOVE |
| PA | PAGING SYSTEM HORN (OUTDOOR) |
| D D | DUAL COIL SPEAKER – SURFACE CEILING, RECESSED CEILING. |
| | PAGING OR PAGING/SOUND MASKING SPEAKER, MOUNTED ABOVE ACOUSTIC TILE CEILING. |

| | |
|---|---|
| F | FIRE ALARM SYSTEM MANUAL PULL STATION, WALL MOUNTED |
| | ALARM BELL OR GONG |
| 30 | STROBE LIGHT – WALL, CEILING MOUNTED (# = CANDELA RATING) |
| S | SPEAKER – WALL, CEILING MOUNTED |
| S 15 | COMBINATION SPEAKER/STROBE, WALL MOUNTED (# = CANDELA RATING) |
| H | HORN – CEILING, WALL MOUNTED |
| H 15 | COMBINATION HORN/STROBE – WALL, CEILING MOUNTED (# = CANDELA RATING) |
| M | MINI HORN – WALL, CEILING MOUNTED |
| M 15 | COMBINATION MINI HORN/STROBE – WALL, CEILING MOUNTED (# = CANDELA RATING) |
| | SPRINKLER VALVE TAMPER SWITCH CONNECTION |
| | SPRINKLER FLOW SWITCH CONNECTION |
| BR,BT | LIGHT BEAM TYPE SMOKE DETECTOR (BR=BEAM RECEIVER, BT=BEAM TRANSMITTER) |
| | SMOKE DETECTOR, DUCT MOUNTED, WITH FULL WIDTH SAMPLING TUBES. PHOTOELECTRIC TYPE UON. |
| D | SMOKE DETECTOR, LOW AIR VELOCITY IN DUCT MOUNTED PHOTOELECTRIC TYPE U.O.N. |
| P,B,R,C | SMOKE DETECTOR – WALL, CEILING MOUNTED (P=PLENUM MOUNTED, B=W/RELAY BASE, R=ELEVATOR RECALL, C=INTEGRAL TO DOOR CLOSURE) |
| | SMOKE DETECTOR MOUNTED BELOW RAISED FLOOR |
| C | ELECTROMAGNETIC DOOR HOLDER – WALL, FLOOR, DOOR CLOSURE MOUNTED. PROVIDED BY DIV. 8 UON. |
| IM | DATA LOOP ISOLATION MODULE |
| CM | ADDRESSABLE CONTROL MODULE |
| MM | ADDRESSABLE MONITOR MODULE |
| EOL | END OF LINE RESISTOR (NOT SHOWN ON PLANS) |
| J | FIREMAN'S PHONE JACK, WALL MOUNTED |
| P | FIREMAN'S PHONE HANDSET, WALL MOUNTED |
| | FIRE/SMOKE DAMPER BY DIV 15. WIDTH OF SYMBOL WILL VARY WITH DUCT WIDTH. PROVIDE POWER AND MONITORING AS INDICATED. |
| | FLAME DETECTOR (FLICKER DETECTOR) |
| | HEAT DETECTOR, CEILING MOUNTED. RATE OF RISE AND FIXED TEMPERATURE TYPE, UON. |
| R/C,F,R | HEAT DETECTOR (R/C=RATE OF COMBUSTION, F=FIXED TEMP. ONLY, R=RATE OF RISE ONLY) |
| | EARLY WARNING SMOKE DETECTION SYSTEM – INCLUDES ALL PIPING BY DIV. 16. |
| | LIGHT (LAMP, SIGNAL LIGHT, INDICATOR LAMP, STROBE) |
| A | FIRE ALARM OUTPUT OR RELEASE ABORT PUSHBUTTON, REFER TO SPECIFICATIONS AND DETAILS. |
| | AGENT RELEASE INITIATING VALVE |
| | BELL SILENCE SWITCH |
| | AGENT DISCHARGE SWITCH |

## GROUNDING SYSTEM

| SYMBOL | DESCRIPTION |
|---|---|
| G | BARE GROUNDING GRID OR CONDUCTORS, UON. |
| GC | GROUNDING CONDUCTOR(S) ROUTED IN CODE SIZED CONDUIT, UON. |
| | GROUND GRID BOND POINT |
| | GROUND GRID BOND POINT – MECHANICAL CONNECTION |
| | GROUND GRID BOND POINT – EXOTHERMIC WELD CONNECTION |
| | 24" GROUND BAR |
| | 60" GROUND BAR |
| | GROUND ROD LOCATION |
| | GROUND ROD IN TEST WELL |
| | LIGHTNING PROTECTION PARAPET MOUNTED AIR TERMINAL |
| | LIGHTNING PROTECTION MID ROOF MOUNTED AIR TERMINAL |
| | LIGHTNING PROTECTION AIR TERMINAL |
| | LIGHTNING PROTECTION CONDUCTOR ROUTED DOWN |
| | LIGHTNING PROTECTION BOND PLATE |
| | LIGHTNING PROTECTION BIMETAL CONNECTION |

## ELECTRICAL EQUIPMENT NAMING CONVENTION LEGEND

| EXAMPLES / LEGEND | EQUIPMENT TYPE | POWER SYSTEM | VOLTAGE | ADDITIONAL DESIG. (1st letter) | FLOOR DESIG. |
|---|---|---|---|---|---|
| MCC– H M 1 A | SUB – UNIT SUBSTATION | BLANK – NORMAL LOADS | H – 480/277 VOLT | BLANK – PANEL | B – BASEMENT/PIT |
| SWBD – SWITCHBOARD | E – EMERGENCY | | | | |

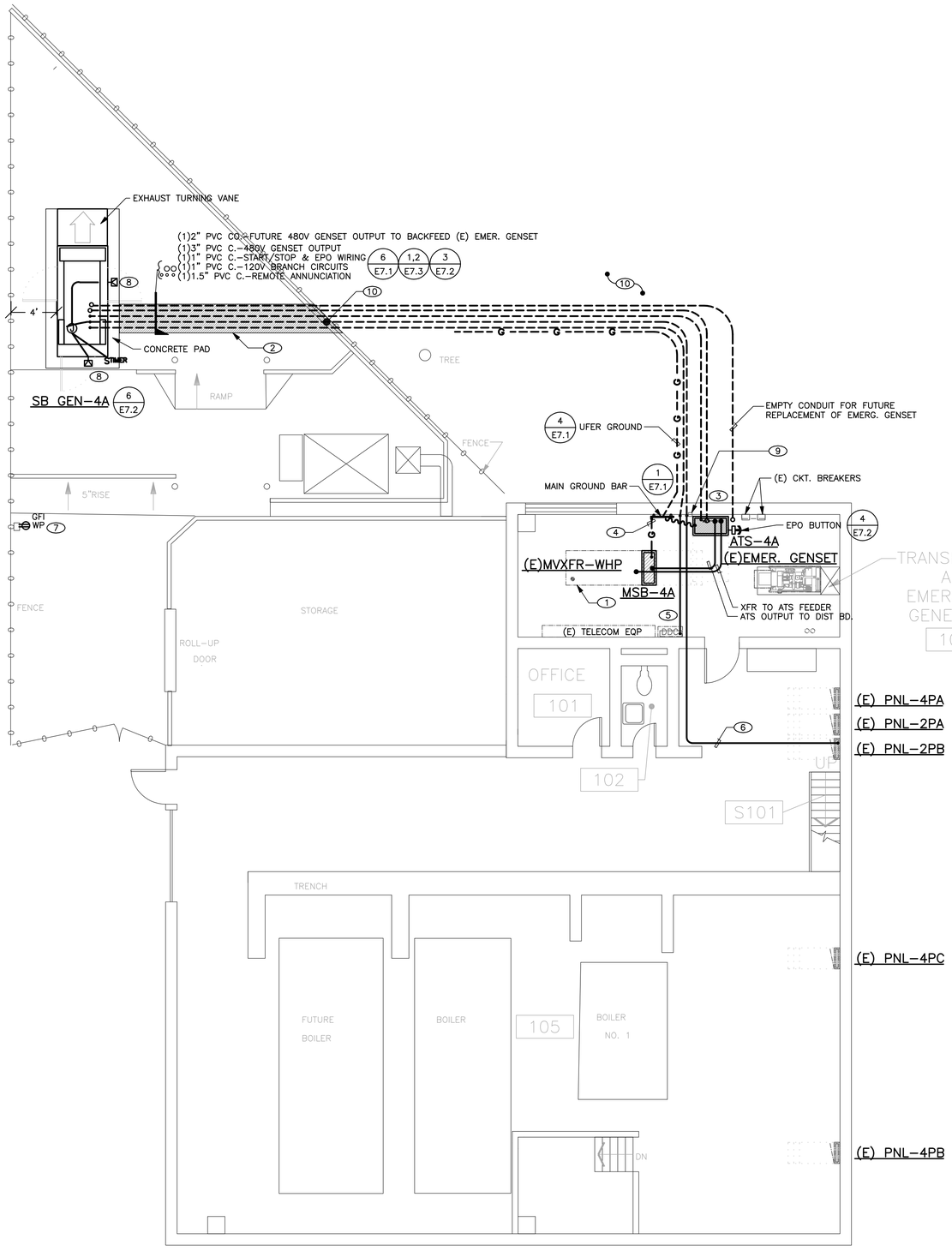
| | |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AFG | ABOVE FINISHED GRADE |
| AIC | EQUIPMENT SHORT CIRCUIT INTERRUPT RATING (RMS SYM. AMPS) |
| AL | ALUMINUM (ALLOY) |
| ALC | AUTOMATIC LIGHTING CONTROL |
| AS | AMPERE (RATED) SWITCH |
| AT | CIRCUIT BRKR TRIP SETTING (AMPS) |
| ATS | AUTOMATIC TRANSFER SWITCH |
| AUTO | AUTOMATIC |
| AUX | AUXILIARY |
| AWG | AMERICAN WIRE GAUGE |
| BAT | BATTERY |
| BG | BELOW GRADE |
| BRKR | CIRCUIT BREAKER |
| C | CONDUIT (CIRCULAR RACEWAY) |
| CAB | CABINET |
| CB | CIRCUIT BREAKER |
| CFM | CUBIC FEET PER MINUTE |
| CKT | CIRCUIT |
| CLG | CEILING |
| CO | CONDUIT ONLY |
| CPT | CONTROL POWER TRANSFORMER |
| CT | CURRENT TRANSFORMER |
| CU | COPPER |
| DC | DIRECT CURRENT |
| DISC | DISCONNECT |
| DIA | DIAMETER |
| DIV | DIVISION |
| DP | DISTRIBUTION PANEL |
| DPDT | DOUBLE POLE DOUBLE THROW |
| DPST | DOUBLE POLE SINGLE THROW |
| DWG | DRAWING |
| E,EMERG | EMERGENCY |
| EF | EXHAUST FAN |
| EMT | ELECTRICAL METALLIC TUBING |
| ENCL | ENCLOSURE |
| EO | ELECTRICALLY OPERATED |
| EOL | END OF LINE |
| EWC | ELECTRIC WATER COOLER |
| EWH | ELECTRIC WATER HEATER |
| FA | FIRE ALARM |
| FAA | FIRE ALARM ANNUNCIATOR |
| FBO | FURNISHED BY OTHERS |
| FC | FOOT CANDLES |
| FF | FLUSH FLOOR MOUNTED |
| FLA | FULL LOAD AMPERES |
| FLEX | FLEXIBLE |
| FPB | FAN POWERED BOX |
| FSD | FIRE/SMOKE DAMPER |
| FW | FLUSH WALL MOUNTED |
| FU | FUSE |
| GEN | GENERATOR |
| GFI | GROUND FAULT CIRCUIT INTERRUPTER |
| GND | GROUND |
| GRAP | GENERATOR REMOTE ANNUNCIATOR PNL |
| GRC | GALVANIZED RIGID STEEL CONDUIT |
| HLO | HANDLE LOCK–ON(OFF) |
| HP | HORSEPOWER |
| HPF | HIGH POWER FACTOR |
| HTR | HEATER |
| HZ | HERTZ (CYCLES PER SECOND) |
| IES | ILLUMINATING ENGINEERING SOCIETY |
| IBC | INDIVIDUAL BRANCH CIRCUIT |
| ID | INSIDE DIAMETER |
| IG | ISOLATED GROUND |
| IMC | INTERMEDIATE METAL CONDUIT |
| KCMIL | THOUSAND CIRCULAR MILS |
| KO | KNOCK OUT |
| KW | KILOWATTS |
| KVA | KILOVOLT–AMPERES |
| LTG | LIGHTING |
| LCP | LIGHTING CONTROL PANEL |
| MAX | MAXIMUM |
| MCA | MINIMUM CIRCUIT AMPERES |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| MLO | MAIN LUGS ONLY |
| MO | MANUAL OPERATOR |
| MTD | MOUNTED |
| MTR | MOTOR |
| –N– | NEUTRAL (GROUNDED CONDUCTOR) |
| NC | NORMALLY CLOSED |
| NEC | NATIONAL ELECTRICAL CODE |
| –,NEG | NEGATIVE |
| NEMA | NATIONAL ELECTRICAL MFGR'S ASSOC. |
| NL | NIGHT LIGHT (UNSWITCHED) |
| NO | NORMALLY OPEN |
| NTS | NOT TO SCALE |
| NP | NAMEPLATE |
| OC | ON CENTER |
| OD | OUTSIDE DIAMETER |
| OFCI | OWNER FURNISHED CONTRACTOR INSTALLED |
| OFOI | OWNER FURNISHED, OWNER INSTALLED |
| OS | OCCUPANCY SENSOR |
| P | POLE |
| PB | PUSHBUTTON |
| PH, ø | PHASE |
| PNL | PANEL |
| +,POS | POSITIVE |
| PRI | PRIMARY |
| REQD | REQUIRED |
| RNC | RIGID NON–METALLIC CONDUIT (PVC) |
| RS | RAPID START |
| RST | REMOTE STATION TRANSMITTER |
| S.A.D. | SEE ARCHITECTURAL DRAWINGS |
| SEC | SECONDARY |
| SN | SHEET NOTE |
| SOL | SOLENOID |
| SPDT | SINGLE POLE DOUBLE THROW |
| SPST | SINGLE POLE SINGLE THROW |
| SUB | SUBSTATION |
| SWBD | SWITCHBOARD |
| SWGR | SWITCHGEAR |
| TB | TERMINAL BOARD |
| TDC | TIME DELAY CLOSING |
| TDO | TIME DELAY OPENING |
| TEL | TELEPHONE |
| TYP | TYPICAL |
| UL | UNDERWRITERS LAB |
| UON | UNLESS OTHERWISE NOTED |
| UPS | UNINTERRUPTIBLE POWER SUPPLY |
| UTX | UTILITY TRANSFORMER |
| V | VOLTS |
| VA | VOLT–AMPERES |
| VFD | VARIABLE FREQUENCY DRIVE |

4. AMERICANS WITH DISABILITIES ACT, (ADA)

## ELECTRICAL DRAWING LIST



| | |
|---|---|
| E0.1 | LEGENDS, ABBREVIATIONS AND DRAWING LIST |
| E2.1 | FIRST FLOOR – POWER PLAN |
| ED2.1 | FIRST FLOOR – DEMOLITION POWER PLAN |
| E6.1 | ELECTRICAL SINGLE–LINE DIAGRAM |
| E7.1 | GROUNDING SYSTEM DETAILS AND DIAGRAM |
| E7.2 | GROUNDING SYSTEM DETAILS AND DIAGRAM |
| E7.3 | GROUNDING SYSTEM DETAILS AND DIAGRAM |




METHOD WHICH MOST SIMPLY CONVEYS THE CIRCUITING INTENT IS EMPLOYED. WHERE DEVICES OR EQUIPMENT ARE SHOWN UNCONNECTED; CONNECT (IN A MANNER CONSISTENT WITH THE MATERIALS AND METHODS INDICATED IN THE SPECIFICATIONS AND DRAWINGS)

D. CIRCUIT SIZES ARE NOT SHOWN ON THE PLANS. CONTRACTOR SHALL USE CIRCUIT SIZES INDICATED IN NOTES OR RESPECTIVE SCHEDULES (PNL, MCC, ETC.) AND INFORMATION IN THE FEEDER AND BRANCH CIRCUIT SCHEDULES.

E. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS. THESE DRAWINGS ARE DIAGRAMMATIC.

F. THE EXISTING BUILDING INCLUDING PORTIONS OF THE RENOVATED AREA SHALL REMAIN IN SERVICE DURING THE CONSTRUCTION PHASE OF THIS PROJECT. ANY MODIFICATIONS TO THE EXISTING ELECTRICAL SYSTEMS THAT MAY REQUIRE THE TEMPORARY INTERRUPTION OF EXISTING SERVICES SHALL BE COMPLETED AFTER NORMAL WORKING HOURS. PRE–SCHEDULE ANY SERVICE INTERRRUPTIONS WITH THE OWNER PRIOR TO STARTING ANY WORK. DO NOT DISTURB THE EXISTING DEPARTMENTS IN THE EXISTING BUILDING COMPLEX.

G. UTILITY OUTAGES: NOT LESS THAN TEN (10) WORKING DAYS PRIOR TO A REQUIRED UTILITY (POWER, TELE, NET) OUTAGE, NOTIFY AND OBTAIN APPROVAL IN WRITING OF SAID OUTAGE FROM THE FACILITY. NO OUTAGE SHALL BE ACCOMPLISHED PRIOR TO THE RECEIPT OF APPROVAL. CONTRACTOR SHALL LOCK–OUT AND RED–TAG THE APPROPRIATE CIRCUIT BREAKER, SWITCH, ETC. RED–TAG SHALL INDICATE WHEN THE OUTAGE WILL BE TERMINATED, AND A TELEPHONE NUMBER TO CONTACT REGARDING THIS OUTAGE. THE TAG SHALL ALSO WARN PEOPLE NOT TO RE–ENERGIZE THE CIRCUIT SYSTEM BECAUSE OF POTENTIAL DANGER TO PERSONNEL AND EQUIPMENT. ALL WORK ASSOCIATED WITH ANY POWER OUTAGES SHALL BE COMPLETED AFTER NORMAL WORKING HOURS.

H. EXISTING WIRING WHERE SHOWN ON THE DRAWINGS IS BASED ON AVAILABLE AS–BUILT DRAWINGS AND FIELD INFORMATION. CONTRACTOR SHALL VERIFY EXISTING INSTALLATIONS AND THE TIME FOR DOING SO SHALL BE INCLUDED IN THIS BID.

I. ALL NON–UNDERGROUND CONDUITS TO BE INSTALLED 90° TO BUILDING LINES – NO EXCEPTIONS.

## SHEET NOTES (#)

1. EXISTING MV TRANSFORMER SCOPE OF WORK:
   - 1.1. CLEAN AND RETORQUE EXISTING MV TRANSFORMER.
   - 1.2. PERFORM MEGGAR TEST OF WINDINGS.
   - 1.3. PREPARE CONNECTIONS TO ACCOMMODATE NEW ATS NORMAL SIDE FEEDER.
2. PROVIDE NEW CONCRETE PAD AS REQUIRED FOR COVERING TRENCH. SEE STRUCTURAL DRAWING FOR MORE INFORMATION.
3. SAWCUT FLOOR AS REQUIRED TO ALLOW FOR UNDERGROUND CONDUITS TO STUB–UP INTO BOTTOM OF ATS. CONTRACTOR MAY ALSO CORE DRILL THROUGH WALL WITH CONDULETS.
4. EXTEND AND RECONNECT EXISTING GROUNDING ELECTRODES TO NEW GROUND BAR
5. PROVIDE EMPTY 3/4" EMT CONDUIT INTO EXISTING SIEMENS BMS PANEL.
6. CONNECT TO EXISTING 120/208V PANEL FOR LIGHTING AND GENERATOR 120V BRANCH CIRCUITS
7. PROVIDE RECEPTACLE NEAR EXISTING JUNCTION BOX.
8. PROVIDE EXTERIOR RATED, ADJUSTABLE DOUBLE–HEAD, PAR64 LUMINAIRE. MOUNT ON SIDE OF GENERATOR AND CONNECT TO INTERMATIC 0–6 HOUR, SPRING WOUND, NO–HOLD TIMER SWITCH WITH FLIP–UP WEATHERPROOF COVERPLATE ON CAST ALUMINUM J–BOXES. ROUTE CONDUITS INSIDE GENERATOR HOUSING.
9. DO NOT BLOCK EXISTING J–BOX. REPLACE MISSING COVER.
10. RESTORE FENCE, CONCRETE SLAB, CURBS AND LANDSCAPING TO ORIGINAL OR BETTER CONDITION. REFER TO STRUCTURAL DRAWING FOR CONCRETE WORK.

| TAG | MET | SETS | RNC | PHASE/NEUTRAL | GROUND (5) | |
|---|---|---|---|---|---|---|
| 00.4 | 3.50" | 11 | 4.00" | (4) 500 KCMIL | 500 KCMIL | – |
| 00.3 | 3.50" | 11 | 4.00" | (4) 500 KCMIL | 500 KCMIL | – |
| 00.4 | 3.50" | 10 | 4.00" | (4) 500 KCMIL | 500 KCMIL | – |
| 00.3 | 3.50" | 8 | 4.00" | (3) 500 KCMIL | 500 KCMIL | – |
| 00.4 | 3.50" | 11 | 4.00" | (4) 600 KCMIL | 500 KCMIL | (6) |
| 00.3 | 3.00" | 11 | 4.00" | (3) 600 KCMIL | 500 KCMIL | (6) |
| 00.4 | 3.00" | 7 | 4.00" | (4) 500 KCMIL | 350 KCMIL | – |
| 00.3 | 3.00" | 7 | 4.00" | (3) 500 KCMIL | 350 KCMIL | – |
| 00.4 | 3.00" | 6 | 4.00" | (4) 400 KCMIL | 250 KCMIL | – |
| 00.3 | 3.00" | 6 | 4.00" | (3) 400 KCMIL | 250 KCMIL | – |
| 00.4K | 3.00" | 5 | 4.00" | (5) 400 KCMIL | #4/0 | (1) |
| 00.4 | 3.00" | 5 | 4.00" | (4) 400 KCMIL | #4/0 | – |
| 00.3 | 3.00" | 5 | 4.00" | (3) 400 KCMIL | #4/0 | – |
| 00.4 | 3.50" | 4 | 4.00" | (4) 500 KCMIL | 250 KCMIL | – |
| 00.3 | 3.50" | 4 | 4.00" | (3) 500 KCMIL | #4/0 | – |
| 00.4 | 3.00" | 4 | 4.00" | (4) 350 KCMIL | #3/0 | – |
| 00.3 | 2.50" | 4 | 3.00" | (3) 350 KCMIL | #3/0 | – |
| 00.4K | 3.00" | 3 | 4.00" | (5) 400 KCMIL | #2/0 | (1) |
| 00.4 | 3.00" | 3 | 4.00" | (4) 400 KCMIL | #2/0 | – |
| 00.3 | 3.00" | 3 | 4.00" | (3) 400 KCMIL | #2/0 | – |
| 0.4K | 3.00" | 3 | 4.00" | (5) 300 KCMIL | #1/0 | (1) |
| 00.4 | 3.00" | 3 | 4.00" | (4) 300 KCMIL | #1/0 | – |
| 00.3 | 3.00" | 2 | 4.00" | (3) 500 KCMIL | #1/0 | – |
| 00.4 | 3.50" | 2 | 4.00" | (4) 500 KCMIL | #1/0 | – |
| 00.3 | 3.00" | 2 | 4.00" | (3) 400 KCMIL | #1/0 | – |
| 00.4 | 3.00" | 2 | 4.00" | (4) 350 KCMIL | #1 | – |
| 00.3 | 2.50" | 2 | 3.00" | (3) 350 KCMIL | #1 | – |
| 0.4K | 3.00" | 2 | 4.00" | (5) 250 KCMIL | #2 | (1) |
| 00.4 | 2.50" | 2 | 3.00" | (4) 250 KCMIL | #2 | – |
| 00.3 | 2.00" | 2 | 3.00" | (3) 250 KCMIL | #2 | – |
| 00.4 | 2.50" | 2 | 3.00" | (4) #4/0 | #2 | – |
| 00.3 | 2.00" | 2 | 2.50" | (3) #4/0 | #2 | – |
| 0.4K | 2.50" | 2 | 3.00" | (5) #3/0 | #2 | (1) |
| 00.4 | 2.00" | 2 | 2.50" | (4) #3/0 | #2 | – |
| 00.3 | 3.00" | 1 | 4.00" | (3) 500 KCMIL | #2 | – |
| 00.4 | 3.50" | 1 | 4.00" | (4) 500 KCMIL | #2 | – |
| 00.3 | 2.50" | 1 | 4.00" | (3) 400 KCMIL | #2 | – |
| 00.4 | 3.00" | 1 | 4.00" | (4) 350 KCMIL | #4 | – |
| 00.3 | 2.50" | 1 | 3.00" | (3) 350 KCMIL | #4 | – |
| 75.4 | 3.00" | 1 | 4.00" | (4) 300 KCMIL | #4 | – |
| 75.3 | 2.50" | 1 | 3.00" | (3) 300 KCMIL | #4 | – |
| 0.4K | 3.00" | 1 | 4.00" | (5) 250 KCMIL | #4 | (1) |

| TAG | MET | SETS | RNC | PHASE/NEUTRAL | GROUND (5) | |
|---|---|---|---|---|---|---|
| 250.4 | 2.50" | 1 | 3.00" | (4) 250 KCMIL | #4 | – |
| 250.3 | 2.50" | 1 | 3.00" | (3) 250 KCMIL | #4 | – |
| 225.4 | 2.50" | 1 | 3.00" | (4) #4/0 | #4 | (1) |
| 225.4G | 2.50" | 1 | 3.00" | (4) #4/0 | #2/0 | – |
| 2254MC | | 1 | | (4) #4/0 | | MC CABLE |
| 200.4K | 2.50" | 1 | 3.00" | (5) #3/0 | #6 | – |
| 200.4 | 2.00" | 1 | 2.50" | (4) #3/0 | #6 | – |
| 200.3 | 2.00" | 1 | 2.50" | (3) #3/0 | #6 | – |
| 175.4K | 2.00" | 1 | 2.50" | (5) #2/0 | #6 | (1) |
| 175.4 | 2.00" | 1 | 2.50" | (4) #2/0 | #6 | – |
| 175.3 | 1.50" | 1 | 2.00" | (3) #2/0 | #6 | – |
| 150.4K | 2.00" | 1 | 2.50" | (5) #1/0 | #6 | – |
| 150.4 | 1.50" | 1 | 2.00" | (4) #1/0 | #6 | – |
| 150.3 | 1.50" | 1 | 2.00" | (3) #1/0 | #6 | – |
| 125.4 | 1.50" | 1 | 2.00" | (4) #1 | #6 | – |
| 125.3 | 1.25" | 1 | 2.00" | (3) #1 | #6 | – |
| 110.4K | 1.50" | 1 | 2.00" | (3) #2, (1)#2/0–N | #6 | (1) |
| 110.4 | 1.25" | 1 | 2.00" | (4) #2 | #6 | – |
| 100.2N | 1.25" | 1 | 2.00" | (2) #2 | #6 | – |
| 100.4 | 1.25" | 1 | 2.00" | (4) #2 | #8 | – |
| 100.3 | 1.25" | 1 | 2.00" | (3) #2 | #8 | – |
| 90.4 | 1.25" | 1 | 2.00" | (4) #4 | #8 | – |
| 90.3 | 1.00" | 1 | 1.50" | (3) #4 | #8 | – |
| 80.4 | 1.25" | 1 | 1.50" | (4) #4 | #8 | – |
| 80.3 | 1.00" | 1 | 1.50" | (3) #4 | #8 | – |
| 70.4K | 1.25" | 1 | 2.00" | (3) #4, (1)#2–N | #8 | (1) |
| 70.4 | 1.25" | 1 | 2.00" | (4) #4 | #8 | – |
| 70.3 | 1.00" | 1 | 1.50" | (3) #4 | #8 | – |
| 60.4 | 1.00" | 1 | 1.50" | (4) #6 | #10 | – |
| 60.3 | 0.75" | 1 | 1.50" | (3) #6 | #10 | – |
| 50.4K | 1.00" | 1 | 1.50" | (3) #6, (1)#4–N | #10 | (1) |
| 50.4 | 1.00" | 1 | 1.50" | (4) #6 | #10 | – |
| 50.3 | 0.75" | 1 | 1.50" | (3) #6 | #10 | – |
| 40.4 | 0.75" | 1 | 1.00" | (4) #8 | #10 | – |
| 40.3 | 0.75" | 1 | 1.00" | (3) #8 | #10 | – |
| 30.4K | 0.75" | 1 | 1.00" | (3) #10, (1)#8–N | #10 | (1) |
| 30.4 | 0.75" | 1 | 1.00" | (4) #10 | #10 | – |
| 30.3 | 0.75" | 1 | 1.00" | (3) #10 | #10 | – |
| 20.4 | 0.75" | 1 | 1.00" | (4) #12 | #12 | – |
| 20.3 | 0.75" | 1 | 1.00" | (3) #12 | #12 | – |
| 15.4 | 0.75" | 1 | 1.00" | (4) #12 | #12 | – |
| 15.3 | 0.75" | 1 | 1.00" | (3) #12 | #12 | – |
| XFR | | | | | | (2) |
| SCHD | | | | | | (3) |

GENERAL NOTES:

1. CONDUCTORS AND CONDUITS SHOWN IN THIS SCHEDULE ARE BASED ON COPPER CONDUCTORS WITH THHN/THWN INSULATION.
2. THIS SCHEDULE SHALL BE USED ON ALL FEEDERS SERVING LOADS WHERE THE CIRCUIT BREAKER SIZE MATCHES THE AMPACITY OF ITS FEEDER. USE THE "MOTOR CIRCUIT SCHEDULE" FOR LOADS, SUCH AS MOTORS, PUMPS, FANS, CHILLERS, ETC., WHERE THE CIRCUIT BREAKER SIZE IS LARGER THAN THE AMPACITY OF ITS FEEDER.
3. PROVIDE NOTED SIZE GROUND CONDUCTOR IN EACH CONDUIT OF FEEDERS CONSISTING OF MULTIPLE SETS OF CONDUCTORS.
4. NOT ALL FEEDERS ARE NECESSARILY USED ON THIS PROJECT.
5. NOMINAL AMPACITIES GREATER THAN 100 AMPS ARE FOR 75°C
6. TERMINATIONS: ON FEEDERS SHOWN WITH A ".6" SUFFIX, PROVIDE SIX PHASE CONDUCTORS AND ONE GROUND WIRE IN CODE SIZED CONDUIT. INCLUDE 80% DERATING FACTOR ON PHASE CONDUCTOR SIZE.

SCHEDULE REMARKS:

(1) OVERSIZED (173% MIN.) NEUTRAL FROM K–4 OR HIGHER RATED XFRS.
(2) REFER TO TRANSFORMER SCHEDULE FOR STANDARD PRIMARY AND SECONDARY FEEDER SIZES.
(3) REFER TO MCC AND PANEL SCHEDULES FOR FEEDER SIZES TO EQUIPMENT NOTED WITH THIS TAG.
(4) "MET"= EMT, GRC (RIGID), RAC, OR PVC COATED GRC TYPE CONDUITS. "RNC"= PVC 40, PVC 80 OR FIBERGLASS TYPE CONDUITS ROUTED UNDERGROUND. REFER TO SIZING ON DRAWINGS IF "RNC" CONDUITS ARE ROUTED ABOVEGROUND. CONDUIT SIZES NOTED ON SINGLE–LINE DIAGRAM OR ON PLANS SUPERSEDE SIZES NOTED ABOVE IF LARGER.
(5) PROVIDE GROUND WIRE NOTED ABOVE IN ALL FEEDERS AND BRANCH CIRCUITS.
(6) FEEDER OVERSIZED TO COMPLY WITH DUCT BANK HEATING CALCULATIONS

## BRANCH CIRCUIT SCHEDULE

| FEEDER TAG | CONDUITS (1) MET | SETS | RNC | CONDUCTORS PER SET PHASE/NEUTRAL | GROUND (2) | REMARKS |
|---|---|---|---|---|---|---|
| 0.4 | 1.00" | 1 | 1.50" | (3) #6, (1) #6N | #10 | 3ø,3W,N |
| 0.3 | 0.75" | 1 | 1.00" | (3) #6 | #10 | 3ø,3W |
| .2N | 0.75" | 1 | 1.00" | (2) #6, (1) #6N | #10 | 1ø,2W,N |
| 0.2 | 0.75" | 1 | 1.00" | (2) #6 | #10 | 1ø,2W |
| 0.1 | 0.75" | 1 | 1.00" | (1) #6, (1) #6N | #10 | 1ø,1W,N |
| 0.4 | 0.75" | 1 | 1.00" | (3) #6, (1) #6N | #10 | 3ø,3W,N |
| 0.3 | 0.75" | 1 | 1.00" | (3) #6 | #10 | 3ø,3W |
| .2N | 0.75" | 1 | 1.00" | (2) #6, (1) #6N | #10 | 1ø,2W,N |
| 0.2 | 0.75" | 1 | 1.00" | (2) #6 | #10 | 1ø,2W |
| 0.1 | 0.75" | 1 | 1.00" | (1) #6, (1) #6N | #10 | 1ø,1W,N |
| 0.4 | 0.75" | 1 | 1.00" | (3) #8, (1) #8N | #10 | 3ø,3W,N |
| 0.3 | 0.75" | 1 | 1.00" | (3) #8 | #10 | 3ø,3W |
| .2N | 0.75" | 1 | 1.00" | (2) #8, (1) #8N | #10 | 1ø,2W,N |
| 0.2 | 0.75" | 1 | 1.00" | (2) #8 | #10 | 1ø,2W |
| 0.1 | 0.75" | 1 | 1.00" | (1) #8, (1) #8N | #10 | 1ø,1W,N |

| FEEDER TAG | CONDUITS (1) MET | SETS | RNC | CONDUCTORS PER SET PHASE/NEUTRAL | GROUND (2) | REMARKS |
|---|---|---|---|---|---|---|
| 30.4 | 0.75" | 1 | 1.00" | (3) #10, (1) #10N | #10 | 3ø,3W,N |
| 30.3 | 0.75" | 1 | 1.00" | (3) #10 | #10 | 3ø,3W |
| 30.2N | 0.75" | 1 | 1.00" | (2) #10, (1) #10N | #10 | 1ø,2W,N |
| 30.2 | 0.75" | 1 | 1.00" | (2) #10 | #10 | 1ø,2W |
| 30.1 | 0.75" | 1 | 1.00" | (1) #10, (1) #10N | #10 | 1ø,1W,N |
| 20.4 | 0.50" | 1 | 1.00" | (3) #12, (1) #12N | #12 (5) | 3ø,3W,N |
| 20.3 | 0.50" | 1 | 1.00" | (3) #12 | #12 (5) | 3ø,3W |
| 20.2N | 0.50" | 1 | 1.00" | (2) #12, (1) #12N | #12 (4)(5) | 1ø,2W,N |
| 20.2 | 0.50" | 1 | 1.00" | (2) #12 | #12 (4)(5) | 1ø,2W |
| 20.1 | 0.50" | 1 | 1.00" | (1) #12, (1) #12N | #12 (3)(4)(5) | 1ø,1W,N |
| 20.4C | 0.75" | 1 | 1.00" | (4) #10, (2) #10N | #12 (3) | (4) 20A/1P |
| 20.3C | 0.75" | 1 | 1.00" | (3) #10, (1) #10N | #12 (3) | (3) 20A/1P |
| 20.2C | 0.75" | 1 | 1.00" | (2) #10, (1) #10N | #12 (3) | (2) 20A/1P |

GENERAL NOTES:

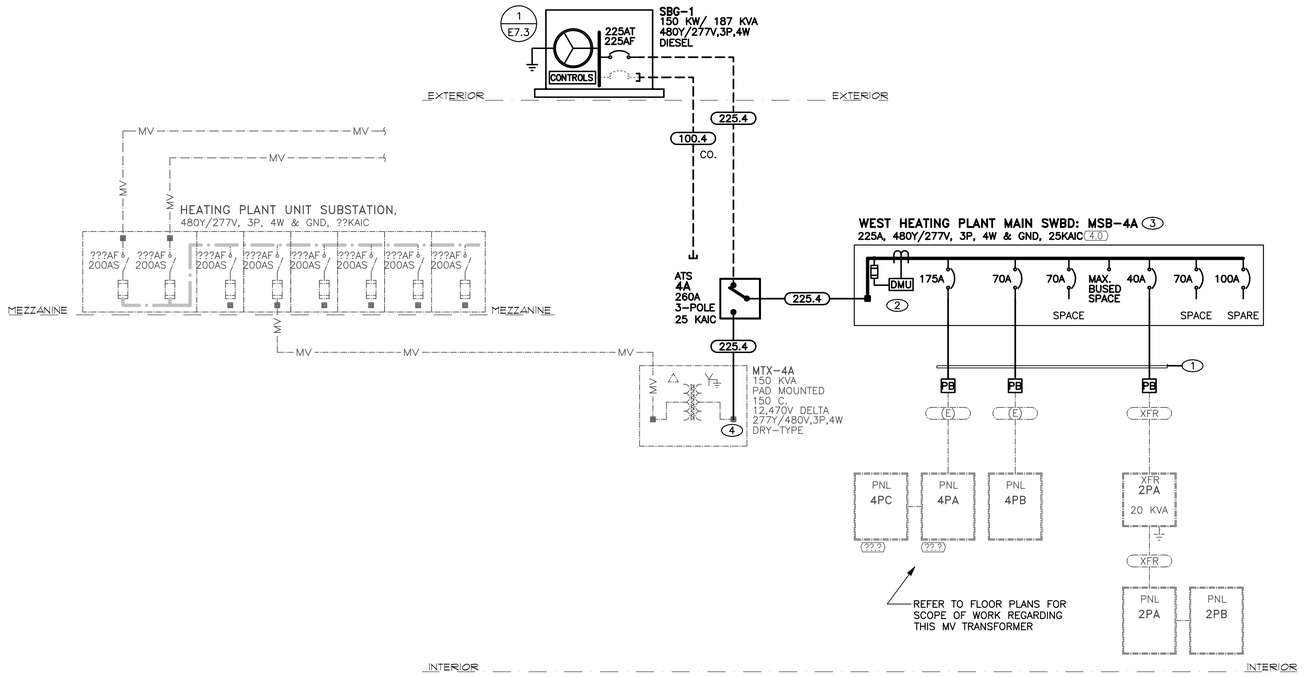
CONDUCTORS AND CONDUITS SHOWN IN THIS SCHEDULE ARE BASED ON COPPER CONDUCTORS WITH THHN/THWN INSULATION.

THIS SCHEDULE SHALL BE USED ON ALL BRANCH CIRCUITS SERVING LOADS WHERE THE CIRCUIT BREAKER SIZE MATCHES THE AMPACITY OF THE BRANCH CIRCUIT CONDUCTORS. USE THE "MOTOR CIRCUIT SCHEDULE" FOR LOADS, SUCH AS MOTORS, PUMPS, FANS, CHILLERS, ETC., WHERE THE CIRCUIT BREAKER SIZE IS LARGER THAN THE AMPACITY OF ITS CIRCUIT CONDUCTORS. (NEC 250–95)

NOT ALL BRANCH CIRCUITS ARE NECESSARILY USED ON THIS PROJECT.

SCHEDULE REMARKS:

(1) "MET"= EMT, GRC (RIGID), RAC, OR PVC COATED GRC TYPE CONDUITS. "RNC"= PVC 40, PVC 80 OR FIBERGLASS TYPE CONDUITS ROUTED UNDERGROUND. REFER TO SIZING ON DRAWINGS IF "RNC" CONDUITS ARE ROUTED ABOVEGROUND. CONDUIT SIZES NOTED ON SINGLE–LINE DIAGRAM OR ON PLANS SUPERSEDE SIZES NOTED ABOVE ONLY IF LARGER.
(2) PROVIDE GROUND WIRE NOTED ABOVE IN ALL BRANCH CIRCUITS.
(3) THESE BRANCH CIRCUITS TAGS ARE TYPICALLY NOT SHOWN ON PLANS FOR CLARITY REASONS. CONTRACTOR SHALL USE THIS INFORMATION AS IT APPLIES FOR ALL CONDUITS CONTAINING ONE OR MORE 20A/1P CKTS




1 **WEST HEATING PLANT - PARTIAL ELECTRICAL SINGLE-LINE DIAGRAM**
SCALE: NONE

C. ALL TRANSFORMERS ARE 480V DELTA PRIMARY TO 208Y/120V SECONDARY, 115 DEGREE C. RISE, U.O.N.

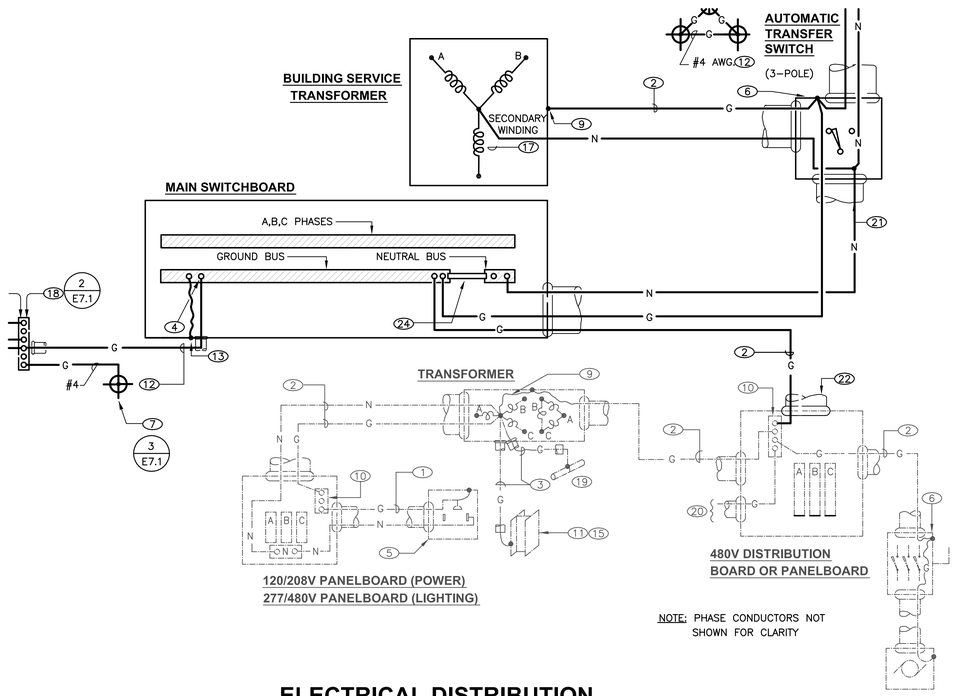
D. ITEMS SHOWN WITH THIN DASH–DOT OR DASHED LINES ARE EXISTING.

E. ITEMS SHOWN WITH SHADED SHORT–DASHED LINES ARE FUTURE.

F. THE VALUE IN THE WIDE HEXAGON IS THE AVAILABLE INTERRUPTING SHORT–CIRCUIT CURRENT (AIC) AT THAT PIECE OF EQUIPMENT.

## SHEET NOTES (#)

1. EXTEND AND CONNECT EXISTING FEEDERS TO NEW CIRCUIT BREAKERS. USE PULLBOX TO HOUSE HIGH–PRESSURE CRIMP BUTT SPLICES FOR EXTENSION OF CONDUCTORS, IF EXISTING CONDUCTORS ARE TOO SHORT.
2. PROVIDE SIEMENS DEM METER?
3. SQUARE D I–LINE PANEL IS PREFERRED
4. EXTEND TRANSFORMER OUTPUT CONDUCTORS TO ATS. CLOSE OFF EXISTING CONDUIT HOLES IN TRANSFORMER HOUSING.

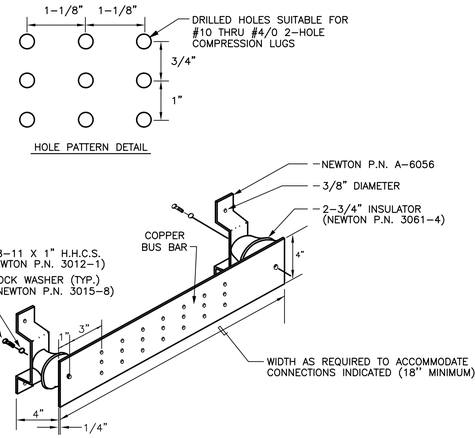



## 1 ELECTRICAL DISTRIBUTION SYSTEM GROUNDING SCHEMATIC

SCALE: NONE

16060-01

1. ALL EQUIPMENT GROUNDING CONDUCTORS FOR RECEPTACLE BRANCH CIRCUITS SHALL BE SIZED PER N.E.C. TABLE 250.122. MULTIPLE BRANCH CIRCUITS IN EACH HOMERUNS SHALL USE ONLY ONE EQUIPMENT GROUNDING CONDUCTOR, UON.
2. SIZE EQUIPMENT GROUNDING CONDUCTORS FOR FEEDER CIRCUITS PER FEEDER SCHEDULE OR IF NOT SHOWN PER N.E.C. TABLE 250.122.
3. ROUTE ONE COPPER GROUNDING ELECTRODE CONDUCTOR, SIZED PER N.E.C. TABLE 250.66, IN CONDUIT TO GROUNDING ELECTRODES SHOWN.
4. UTILITY SERVICE GROUNDING SHALL BE IN ACCORDANCE WITH N.E.C. 250.24(A).
5. TYPICAL RECEPTACLE WITH EQUIPMENT GROUNDING CONDUCTOR. GROUND PER N.E.C. 250.146.
6. CONNECT EQUIPMENT GROUNDING CONDUCTORS TO GROUND LUG BONDED TO THE ENCLOSURE.
7. GROUND ROD OR OTHER MADE ELECTRODES PER N.E.C. 250.52,56 AND AS SHOWN ON DRAWINGS AND SPECIFICATIONS. PROVIDE 10'-0" MINIMUM BETWEEN RODS.
8. GROUND CONNECTION TO COMMUNICATION BACKBOARDS, ETC. REFER TO EACH SYSTEM FOR SIZE AND QUANTITY. PROVIDE #6 AWG. MIN. U.O.N.
9. MAIN BONDING JUMPER: SIZE PER N.E.C. 250-30(A)(1) AND TABLE 250-66.
10. EQUIPMENT COPPER GROUNDING BAR BONDED TO ENCLOSURE.
11. NOT USED
12. GROUNDING ELECTRODE COPPER CONDUCTOR: #4/0 AWG, U.O.N.
13. EQUIPMENT BONDING JUMPER PER N.E.C. 250.28(C), 250.102(B), 250.92 AND TABLE 250.66.
14. DO NOT MAKE ANY OTHER GROUND CONNECTIONS TO THE CENTER TAP. ALL GROUND CURRENTS MUST FLOW THROUGH HIGH RESISTANCE GROUNDING RESISTOR.
15. SEPARATELY DERIVED SYSTEM GROUNDING ELECTRODE PER N.E.C. 250.30. CONNECT TO MAIN BUILDING REFERENCE GROUND BUS IF IN SAME ROOM.
16. GROUND GRID. REFER TO SPECIFICATIONS AND DETAIL NOTED.
17. GROUNDED CONDUCTOR (NEUTRAL) BROUGHT TO SERVICE EQUIPMENT PER N.E.C. 250.24(b).
18. MAIN BUILDING REFERENCE GROUND BUS. REFER TO SPECIFICATIONS AND DETAIL NOTED.
19. COLD WATER PIPE PER N.E.C. 250.52(A)(1).
20. TO LIGHTING OR OTHER 277/480 VOLT BRANCH CIRCUIT.
21. ALL GROUNDINGS FOR THE EMERGENCY POWER DISTRIBUTION SYSTEM SHALL CONFORM TO ALL REQUIREMENTS SHOWN FOR THE NORMAL POWER DISTRIBUTION SYSTEM.
22. BOND PARALLEL METALLIC CONDUITS TOGETHER USING GROUNDING BUSHINGS AND ONE GROUNDING CONDUCTOR IDENTICAL IN SIZE TO GROUNDING CONDUCTOR IN EACH OF THE PARALLEL CONDUIT RUNS.
23. UFER GROUND. REFER TO SPECIFICATIONS AND DETAIL NOTED.
24. NEUTRAL DISCONNECT LINK




### GENERAL NOTES

A. BUS BARS OVER 20" IN LENGTH REQUIRE AT LEAST ONE ADDITIONAL 2-3/4" INSULATOR (NEWTON P.N. 3061-4) SUPPORT.

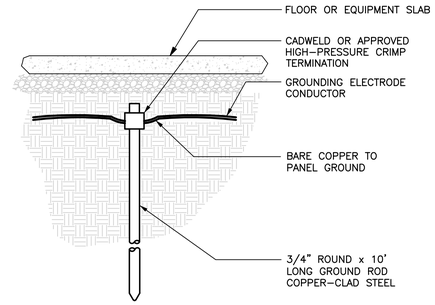
B. BOLT EACH SUPPORT TO A METAL WALL STUD.

C. PROVIDE #6 BONDING JUMPER FROM THIS GROUND BAR TO THE MAIN INCOMING WATER PIPE.

D. ALL TERMINATIONS SHALL BE HIGH-PRESSURE CRIMP TYPE WITH TWO-HOLE LUGS

## 2 MAIN BUILDING REFERENCE GROUNDING BAR INSTALLATION

SCALE: NONE



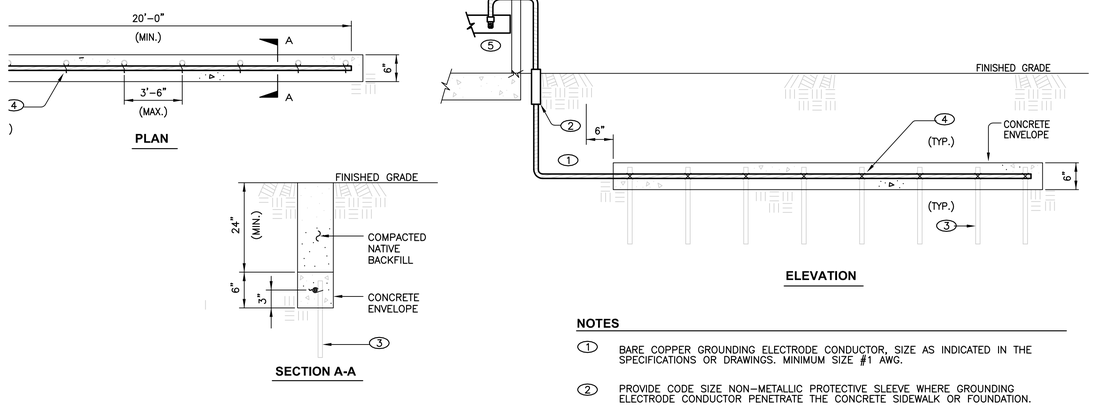

### NOTES

A. GROUND ROD MUST BE INSTALLED IN DIRT NOT IN GRAVEL.

## 3 GROUND ROD DETAIL

SCALE: NO SCALE

16060-11




IND IN EACH UTILITY FEEDER TRENCH IN THE PARKING LOT, NOT INSIDE BUILDING.

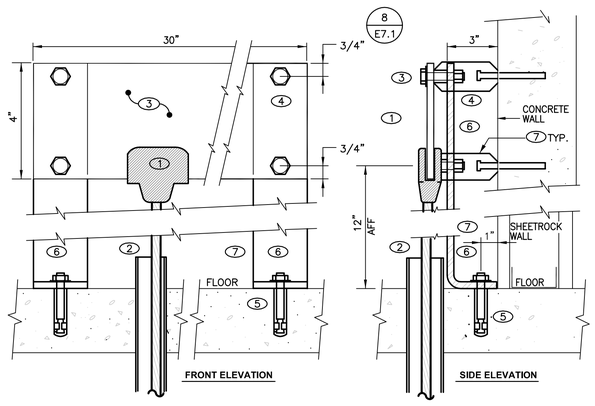
### NOTES

1. BARE COPPER GROUNDING ELECTRODE CONDUCTOR. SIZE AS INDICATED IN THE SPECIFICATIONS OR DRAWINGS. MINIMUM SIZE #1 AWG.
2. PROVIDE CODE SIZE NON-METALLIC PROTECTIVE SLEEVE WHERE GROUNDING ELECTRODE CONDUCTOR PENETRATE THE CONCRETE SIDEWALK OR FOUNDATION.
3. DRIVE CONDUIT OR REBAR STAKES TO SUPPORT GROUNDING ELECTRODE CONDUCTOR AS REQUIRED. MAXIMUM DISTANCE BETWEEN STAKES IS 42".
4. SUPPORT GROUNDING ELECTRODE CONDUCTOR USING TIE WIRES. CONDUCTOR SHALL NOT DEVIATE FROM POSITION SHOWN BY MORE THAN 1/2".
5. MAIN SWITCHBOARD GROUND BUS.

## 4 CONCRETE ENCASED ELECTRODE (UFER)

SCALE: NONE

16060-15



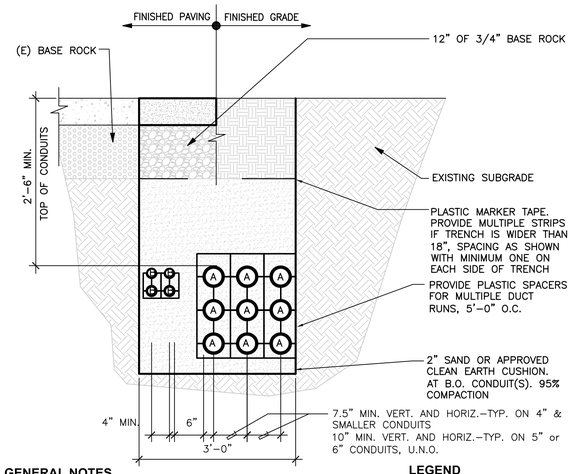

### NOTES

1. IRREVERSIBLE TYPE WELDED OR HIGH-PRESSURE CRIMP GROUND CONDUCTOR TO BUS BAR CONNECTOR. T&B TYPE CB4, CB29 OR EQUAL BY BURNDY OR CADWELD.
2. UNDERGROUND COPPER GROUND CONDUCTORS IN PVC CONDUITS.
3. 1/4" THICK X HEIGHT AND WIDTH SHOWN, COPPER GROUND BUS.
4. 3/8"ø X 3" LONG BOLT WITH LOCK WASHER AND SPACER FOR ATTACHING COPPER GROUND BUS TO SUPPORTS.
5. SUPPORT ANCHOR BOLT. 3 1/2" MINIMUM EMBEDMENT.
6. 1/4" THICK X 2" WIDE GALVANIZED STEEL PLATE GROUND BUS SUPPORTS. BENT AS SHOWN. USE WHERE GROUND BUS IS ADJACENT TO SHEETROCK WALLS.
7. FOR CONCRETE WALL MOUNTING APPLICATIONS: USE STANDARD RED INSULATING BUS BAR STANDOFFS, AND OMIT STEEL FLOOR PLATE GROUND BUS SUPPORT.

## 5 MAIN BUILDING REFERENCE GROUND BUS

SCALE: NONE

16060-07




### GENERAL NOTES

A. DUCT BANK SECTION SHOWN INDICATES GENERAL CONFIGURATION REQUIREMENTS. SEE E2 SERIES DRAWINGS FOR ADDITIONAL INFORMATION. DO NOT DEVIATE FROM THIS DETAIL WITHOUT WRITTEN APPROVAL FROM ENGINEER.

B. INSTALLL CONDUITS AT MINIMUM DEPTHS NOTED

C. PRIOR TO BACKFILL OF DUCT BANK, NOTIFY ELECTRICAL ENGINEER FOR INSPECTION AND APPROVAL.

### LEGEND

A. 4" CONDUIT FOR 480V FEEDERS

B. SMALLER CONDUIT AS NOTED ON SITE PLAN DRAWINGS

## 6 DUCT BANK INSTALLATION

SCALE: NO SCALE


**OTES**

. SEE DRAWINGS FOR ADDITIONAL NAMEPLATE INFORMATION AND COLORS OF NAMEPLATES FOR DIFFERENT SYSTEMS.

. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS. REPLACE QUESTION MARKS WITH CORRECT NUMBERS

. CENTER ALL TEXT HORIZONTALLY

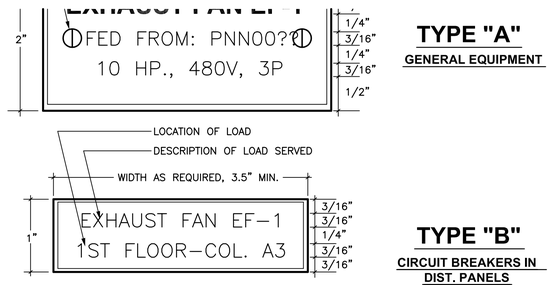
. THIS DETAIL APPLIES TO ALL FLOOR-MOUNTED EQUIPMENT

. DRILL HOLES AND USE POP RIVETS ON EXTERIOR NAMEPLATES ONLY

## MAJOR EQUIPMENT & SWITCHBOARD NAMEPLATES

**SCALE: NONE**

16075-01




**TYPE "A"**

**GENERAL EQUIPMENT**

**TYPE "B"**

**CIRCUIT BREAKERS IN DIST. PANELS**

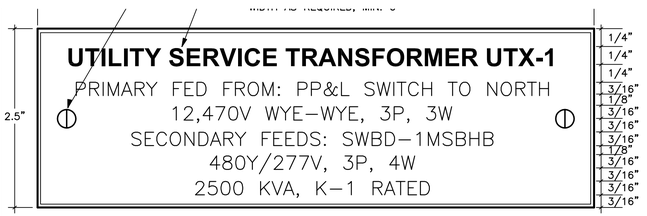
**NOTES**

1. SEE DRAWINGS FOR ADDITIONAL NAMEPLATE INFORMATION AND COLORS OF NAMEPLATES FOR DIFFERENT SYSTEMS.
2. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS. REPLACE QUESTION MARKS WITH CORRECT NUMBERS
3. CENTER ALL TEXT HORIZONTALLY
4. DRILL HOLES AND USE POP RIVETS ON EXTERIOR NAMEPLATES ONLY

## 2 EQUIPMENT IDENTIFICATION NAMEPLATES

**SCALE: NONE**

16075-03



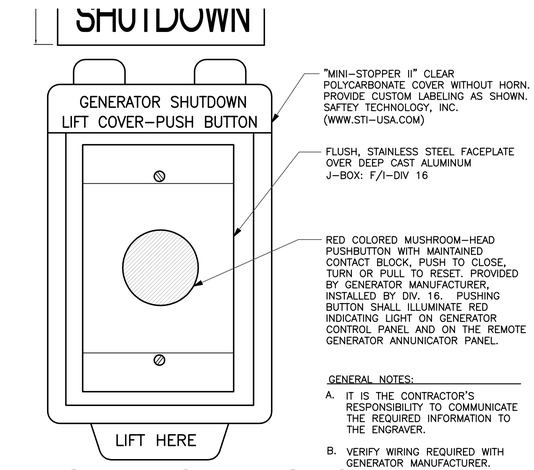

**NOTES**

1. SEE DRAWINGS FOR ADDITIONAL NAMEPLATE INFORMATION AND COLORS OF NAMEPLATES FOR DIFFERENT SYSTEMS.
2. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS. REPLACE QUESTION MARKS WITH CORRECT NUMBERS
3. CENTER ALL TEXT HORIZONTALLY

## 3 BUILDING TRANSFORMER NAMEPLATE

**SCALE: NONE**

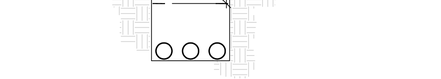
16075-09




## 4 GENERATOR EMERGENCY REMOTE POWER SHUT-OFF

**SCALE: NONE**

16231-14




**SECTION**




**SECTION A-A**

**OTES**

PROVIDE TAPE SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES.

TAPE SHALL BE POLYETHYLENE FILM, 6 INCHES WIDE, 0.004 INCHES THICK, AND A MINIMUM STRENGTH OF 1,750 PSI.

TAPE SHALL CARRY CONTINUOUS INSCRIPTION NAMING THE SPECIFIC UTILITY. COLOR SHALL BE:
ELECTRIC - RED
PHONE & SIGNAL - ORANGE.

TAPE SHALL HAVE FOIL BACKING OR WIRES SUFFICIENT FOR DETECTION BY METAL DETECTOR TO A DEPTH OF 5 FEET.

TAPE SHALL BE PLACED IN PARALLEL RUNS WITH ONE STRIP ON EACH SIDE OF TRENCH AND STRIPS NO GREATER THAN 18" ON CENTER ACROSS WIDTH OF TRENCH.

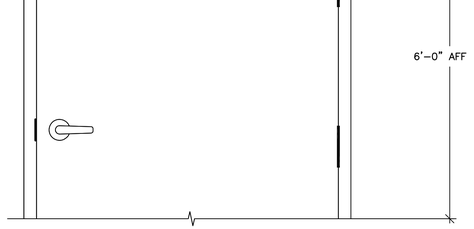
TAPE TO BE RUN CONTINUOUS FROM MANHOLE TO MANHOLE AND HAVE 3 FEET SLACK ROLLED UP AT EACH END. RECORD LOCATION ON AS-BUILT DRAWINGS.

TAPE SHALL BE A MIN. OF 12" ABOVE CONDUITS.

## UNDERGROUND UTILITIES WARNING TAPE

**SCALE: NONE**

16075-07




**NOTES**

A. PROVIDE THESE SIGNS ON ALL DOORS TO ALL GENERATOR ENCLOSURES. PROVIDE ON ONE DOOR ONLY FOR DOUBLE DOOR LOCATIONS.

B. PROVIDE THESE SIGNS ON END OF GENERATOR

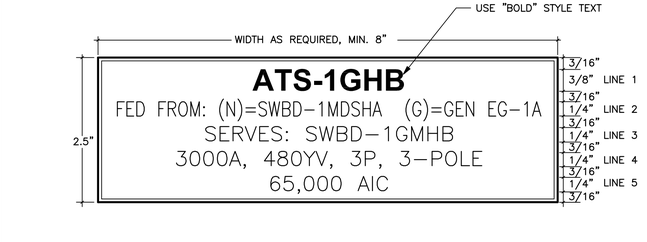
C. NUMBERS SHOWN ARE MODEL NUMBERS FOR EMEDCO, PROVIDE BRADY USA, INC. AS ALTERNATE. SIGNS SHALL BE 10" X 14" PLASTIC. USE POP RIVETS TO ANCHOR TO DOOR OR GENERATOR.

D. DO NOT SUBSTITUTE DIFFERENT SIGNS. TEXT MUST MATCH THOSE NOTED.

## 6 GENERATOR DOOR SIGNAGE

**SCALE: NONE**

16075-14



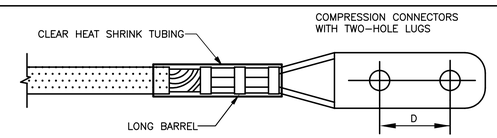

**NOTES**

1. SEE DRAWINGS FOR ADDITIONAL NAMEPLATE INFORMATION AND COLORS OF NAMEPLATES FOR DIFFERENT SYSTEMS.
2. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS. REPLACE QUESTION MARKS WITH CORRECT NUMBERS
3. CENTER ALL TEXT HORIZONTALLY
4. THIS DETAIL APPLIES TO ALL TRANSFER SWITCHES, MANUAL AND AUTOMATIC
5. DRILL HOLES AND USE POP RIVETS ON EXTERIOR NAMEPLATES ONLY

## 10 TRANSFER SWITCH NAMEPLATES

**SCALE: NONE**

16075-01




**TWO-HOLE, LONG BARREL LUG SCHEDULE**

| | T & B | | | | BURNDY | | | |
|---|---|---|---|---|---|---|---|---|
| WIRE SIZE | CATALOG NO. | D | BOLT SIZE | NO. OF CRIMPS | CATALOG NO. | G | HOLE SIZE | NO. OF CRIMPS |
| NO. 6 AWG | — | — | — | — | YA6C-2N | 1-3/4" | 1/2" | 2 |
| NO. 4 AWG | — | — | — | — | YA4C-2N | | | |
| NO. 2 AWG | 54856BE | 3/4" | 1/4" | 2 | YA2C-2N | 1-3/4" | 1/2" | 2 |
| NO. 1 AWG | 54812BE | | 1/4" | | YA1C-2N | | | |
| 1/0 AWG | 54813BE | | 5/16" | | YA25-2N | | | |
| 2/0 AWG | 54862BE-PH | 1-3/4" | 1/2" | 2 | YA26-2N | 1-3/4" | 1/2" | 2 |
| 3/0 AWG | 54864BE-PH | | | | YAZ27-2N | | | |
| 4/0 AWG | 54866BE-PH | | | | YAZ28-2N | | | |
| 250 MCM | 54868BE-PH | | | | YAZ29-2N | | | |
| 350 MCM | 54872BE-PH | 1-3/4" | 1/2" | 4 | YAZ31-2N | 1-3/4" | 1/2" | 4 |
| 500 MCM | 54876BE-PH | | | | YAZ34-2N | | | |
| 750 MCM | 54880BE-PH | | | | YAZ39-2N | | | |

**GENERAL NOTES**

A. TYPICAL FOR ALL GROUND BAR TERMINATIONS AND POWER TERMINATIONS FOR #6 AWG AND LARGER EXCEPT INTEGRAL CIRCUIT BREAKER LUGS MAY BE MECHANICAL TYPE.

B. PROVIDE CLEAR HEAT SHRINK TUBING OVER CRIMP PORTION OF LUG.

C. USE 12-15 TON RATED CRIMPING TOOL WITH DIES MADE BY MANUFACTURER OF LUGS.

D. ALL LUGS MUST BE LONG BARREL, 2-HOLE TYPE WITH CONDUCTOR VIEWING WINDOW OPTION ON SIZES #2/0 AND LARGER;

## 11 POWER & GROUNDING TERMINATIONS

**SCALE: NONE**

16060-13




**NOTES**

1. SEE DRAWINGS FOR ADDITIONAL NAMEPLATE INFORMATION AND COLORS OF NAMEPLATES FOR DIFFERENT SYSTEMS.
2. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS. REPLACE QUESTION MARKS WITH CORRECT NUMBERS
3. CENTER ALL TEXT HORIZONTALLY




**COLOR LEGEND**

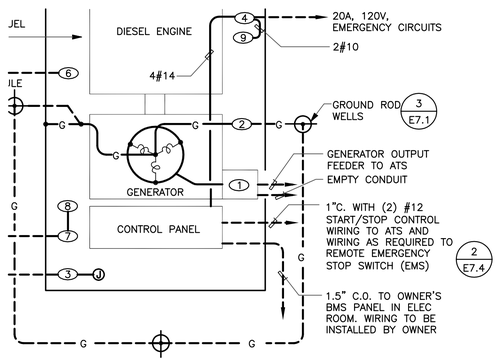
| SERVICE | NAMEPLATE COLOR | | |
|---|---|---|---|
| | TEXT | BACKGROUND | ROWMARK # |
| NORMAL POWER | WHITE | BLACK | 132-412 |
| STANDBY POWER | WHITE | BLUE | 132-512 |
| UPS POWER - SYSTEM "A" | WHITE | ORANGE | 132-612 |
| UPS POWER - SYSTEM "B" | BLACK | YELLOW | 132-704 |
| UPS POWER - SYSTEM "C" | WHITE | GRAY | 132-302 |

**GENERAL NOTES**

A. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

B. TEXT SHOWN ABOVE IS FOR EXAMPLE ONLY. MODIFY TEXT AS REQUIRED TO MATCH EQUIPMENT SPECIFICATIONS.

C. USE 3/32" THICK, 2-PLY ROWMARK PLASTIC STOCK




NOTES:

1. LOAD TERMINATION JUNCTION BOX WITH CIRCUIT BREAKER.
2. GROUND LUG.
3. JUNCTION BOX FOR 120V INTERIOR (3) AND EXTERIOR LIGHTS (2) AND INTERIOR AND EXTERIOR TIMER LIGHT SWITCHES.
4. BATTERY CHARGER WITH WIRING TO CONTROL PANEL AND REMOTE ANNUNCIATOR.
5. SKID FUEL TANK – TWO LEVEL SENSORS, ONE LEAK SENSOR WIRING
6. JACKET WATER HEATER (SET AT 110 DEGREES F. ).
7. JUNCTION BOX FOR GENERATOR ANTI–CONDENSATION HEATERS.
8. BATTERY HEATER (50 – 60 DEGREES F. TEMPERATURE RANGE).
9. STARTING BATTERIES

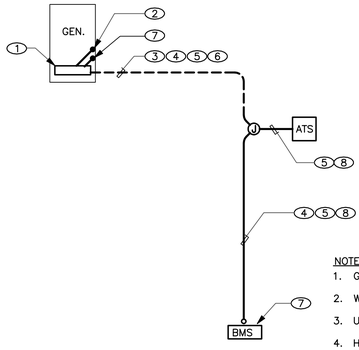
GENERAL NOTES:

4. VERIFY CONDUIT STUB–UP LOCATIONS WITH SHOP DRAWINGS.
3. CIRCUITS (3)(4)(6)(7)(8) SHALL BE CONNECTED TO PANEL INSIDE BUILDING

## UTDOOR DIESEL GENERATOR
## CHEMATIC WIRING INSTALLATION
## SKID TANK, NO LOAD BANK)

ALE: NONE

16231–07

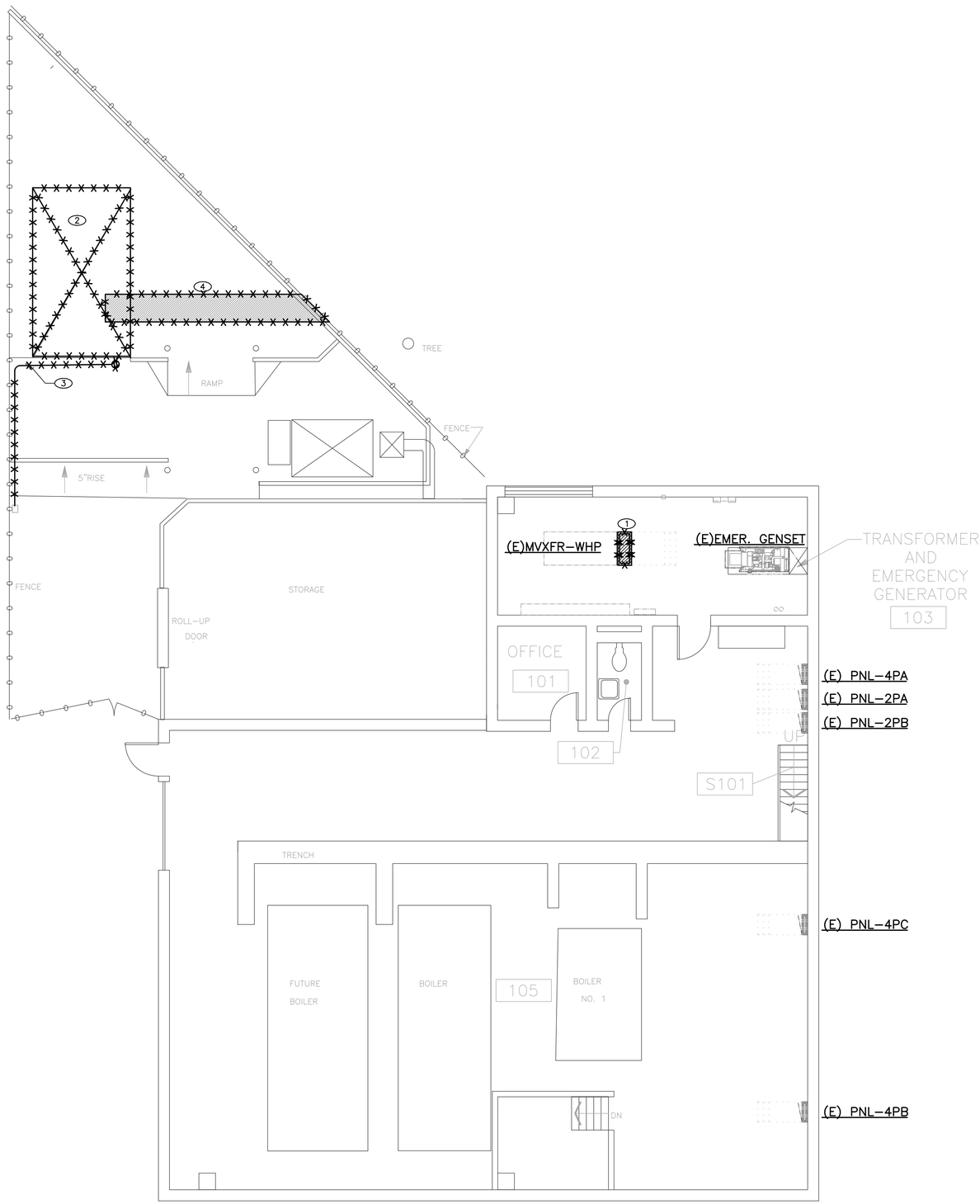



NOTES:

1. GENERATOR CONTROL PANEL
2. WIRING FROM SKID TANK LEVEL ALARMS
3. UNDERGROUND CONDUIT
4. HARDWIRED COMMON TROUBLE AND COMMON ALARM WIRING POINTS (6) #14 FROM GENERATOR TO OWNER'S BMS PANEL. WIRING PROVIDED BY OWNER.
5. HARDWIRED CONTACT WIRING FROM ATS TO OWNER'S BMS PANEL FOR ATS POSITION (2) #14
6. ALARM WIRING FROM BATTERY CHARGER TO GENSET CONTROLLER
7. OWNER'S BMS CONTROLLER INTERFACE
8. OVERHEAD EMT CONDUITAND WIRING

## 2 DIESEL GENERATOR REMOTE ANNUNCIATION WIRING

SCALE: NONE




C. IF POSSIBLE, EXISTING BRANCH CIRCUIT HOMERUN CONDUITS AND WIRES ARE TO REMAIN AND BE REUSED IN THE NEW CONSTRUCTION PHASE OF WORK, DOWNSTREAM BRANCH CIRCUIT CONDUITS AND WIRING SERVING EXISTING-TO- BE-REMOVED EQUIPMENT AND RECEPTACLES ARE TO BE REMOVED. INTENT IS TO REUSE THE MAIN INFRASTRUCTURE AND REMOVE ALL THE BRANCH CIRCUITING THAT WILL NO LONGER BE USED. REMOVE EXISTING HOMERUNS BACK TO PANEL IF THEY WILL NOT BE USED AT THE COMPLETION OF THE PROJECT.

D. CONTRACTOR SHALL VERIFY CIRCUITS WITH TRACING DEVICE AND LABEL CIRCUITS AVAILABLE AT EACH J-BOX, MODIFY DRAWINGS AS REQUIRED TO DOCUMENT ACTUAL CIRCUITING.

E. DO NOT REMOVE ANY CONDUITS SERVING EXISTING TO REMAIN ITEMS, ESPECIALLY TO:
E.1. PANELS, DISTRIBUTION PANELS, TRANSFORMERS, ETC., UON.
E.2. HVAC CONTROLS AND CONTROL PANELS.
E.3. BRANCH CIRCUIT WORK SERVING THE EXISTING CORE AND EXTERIOR LIGHTING.

F. ALL REMOVED ELECTRICAL MATERIAL INCLUDING WIRING, RACEWAYS, OUTLETS, DEVICES, SUPPORTS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE JOB SITE.

G. ALL SALVAGED DISTRIBUTION PANEL AND STORAGE CONTAINER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE JOB SITE.

H. DAMAGE TO OTHER TRADE'S WORK AS A RESULT OF THIS WORK IS TO BE PROMPTLY REPAIRED AT NO EXPENSE TO THE OWNER AND TO THE COMPLETE SATISFACTION OF THE OWNER.

I. CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO SUBMISSION OF BID AND FIELD VERIFY ALL EXISTING CONDITIONS AND THE EXTENT OF THE DEMOLITION WORK. ALL ASSOCIATED DEMOLITION COSTS SHALL BE INCLUDED IN THE BID PRICE. NO EXTRA PAYMENT WILL BE ALLOWED FOR WORK REQUIRED BECAUSE OF DISCERNIBLE CONDITIONS, WHETHER OR NOT SPECIFICALLY SHOWN ON THESE DRAWINGS.

J. THE EXISTING BUILDING INCLUDING PORTIONS OF THE RENOVATED AREA SHALL REMAIN IN SERVICE DURING THE CONSTRUCTION PHASE OF THIS PROJECT. PRE-SCHEDULE ANY SERVICE INTERRUPTIONS WITH THE OWNER PRIOR TO STARTING ANY WORK.

K. UTILITY OUTAGES: NOT LESS THAN TEN (10) WORKING DAYS PRIOR TO A REQUIRED UTILITY (POWER, TELE, NET) OUTAGE, NOTIFY AND OBTAIN APPROVAL IN WRITING OF SAID OUTAGE FROM THE FACILITY. NO OUTAGE SHALL BE ACCOMPLISHED PRIOR TO THE RECEIPT OF APPROVAL. CONTRACTOR SHALL LOCK-OUT AND RED-TAG THE APPROPRIATE CIRCUIT BREAKER, SWITCH, ETC. RED-TAG SHALL INDICATE WHEN THE OUTAGE WILL BE TERMINATED, AND A TELEPHONE NUMBER TO CONTACT REGARDING THIS OUTAGE. THE TAG SHALL ALSO WARN PEOPLE NOT TO RE-ENERGIZE THE CIRCUIT SYSTEM BECAUSE OF POTENTIAL DANGER TO PERSONNEL AND EQUIPMENT.

L. EXISTING WIRING WHERE SHOWN ON THE DRAWINGS IS BASED ON AVAILABLE AS-BUILT DRAWINGS AND FIELD INFORMATION. CONTRACTOR SHALL VERIFY EXISTING CONDITIONS.

## SHEET NOTES (#)

1. EXISTING MV TRANSFORMER SCOPE OF WORK: CLEAN AND RETORQUE EXISTING MV TRANSFORMER. PERFORM MEGGAR TEST OF WINDINGS. DEMO ATTACHED 480V DISTRIBUTION PANEL. PREPARE CONNECTIONS TO ACCOMMODATE NEW ATS FEEDER.
2. DEMO EXISTING STORAGE UNIT WITH ALL EXISTING FOUNDATIONS AND WOOD SUPPORTS
3. RELOCATE EXISTING RECEPTACLE BACK TO EXISTING J-BOX.
4. SAWCUT SLAB AS REQUIRED. REFER TO STRUCTURAL DRAWING.

# GENERAL STRUCTURAL NOTES

**GENERAL NOTES:**

1. ALL CONSTRUCTION AND DESIGN SHALL CONFORM TO THE 2009 INTERNATIONAL BUILDING CODE AS AMENDED BY THE STATE OF OREGON.
2. THE STRUCTURAL DRAWINGS SHALL BE UTILIZED IN CONJUNCTION WITH OTHER DESIGN CONSULTANT'S DRAWINGS (ELECTRICAL, MECHANICAL, ETC.). IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE REQUIREMENTS OF THE DRAWINGS INTO THEIR SHOP DRAWINGS AND CONSTRUCTION.
3. THE GENERAL STRUCTURAL NOTES ARE INTENDED TO SERVE AS THE PROJECT SPECIFICATIONS.
4. CONSTRUCTION SEQUENCE AND METHODS:
   A. THE STRUCTURAL DRAWINGS ARE INTENDED FOR THE STRUCTURE TO ACT AS A WHOLE ONCE CONSTRUCTION IS COMPLETE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE SAFETY AND STABILITY (I.E. TEMPORARY BRACING IF REQUIRED) DURING CONSTRUCTION AS A RESULT OF CONSTRUCTION METHODS AND SEQUENCES.
   B. THE CONTRACTOR SHALL TAKE INTO ACCOUNT COLD WEATHER CONSTRUCTION AND THE EFFECTS OF THERMAL MOVEMENT DURING THE CONSTRUCTION SCHEDULE.
   C. NON-CANTILEVERED OR RESTRAINED RETAINING WALLS SHALL NOT BE BACKFILLED UNTIL THE WALL HAS BEEN TIED INTO THE LOWER AND UPPER SLAB SUPPORTS UNLESS ADEQUATE ENGINEERED BRACING HAS BEEN PROVIDED.
5. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY BETWEEN THE EXISTING CONDITIONS AND CONSTRUCTION DOCUMENTS.
6. SUBMITTALS:
   A. SHOP DRAWINGS FOR ALL STRUCTURAL ITEMS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION AND CONSTRUCTION. SUCH ITEMS INCLUDE:

      CONCRETE MIX DESIGNS AND CONCRETE REINFORCEMENT (INCLUDING MILL TEST REPORTS).

      SHOP DRAWINGS OR CONTRACTOR ENGINEERED DETAILS SHALL BEAR THE SEAL AND SIGNATURE OF A REGISTERED STRUCTURAL ENGINEER IN THE STATE OF OREGON IF IT DIFFERS FROM THE DESIGN OF THE STRUCTURAL DRAWINGS. ANY REVISION FROM THE STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND IS SUBJECT TO THE REVIEW AND ACCEPTANCE BY THE ENGINEER.

   B. SEISMIC BRACING AND RESTRAINT TO THE STRUCTURE OF ANY MEP EQUIPMENT, MACHINERY, AND ASSOCIATED PIPING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CONNECTIONS NOT IN COMPLIANCE WITH SMACNA (SHEET METAL AND AIR CONDITIONING CONTRACTOR'S NATIONAL ASSOCIATION) OR THE MEP DESIGN DRAWINGS, SHALL BEAR THE SEAL OF REGISTERED ENGINEER IN THE STATE OF OREGON AND SHALL BE SUBMITTED ALONG WITH CALCULATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION.
7. DESIGN CRITERIA:
   A. CODE: 2009 INTERNATIONAL BUILDING CODE AS AMENDED BY THE STATE OF OREGON ( 2010 OSSC).
   B. LOADS AND DESIGN CRITERIA: THE FOLLOWING CRITERIA WERE USED IN ADDITION TO THE DEAD LOAD OF THE STRUCTURE.

      SOIL CRITERIA: (PER THE 2010 OSSC)

      ALLOW. SOIL BEARING VALUES 1500 PSF (W/ 1/3 INCREASE FOR SHORT TERM LATERAL LOADS)

      FRICTION COEFFICIENT 0.25

      LATERAL CRITERIA:

      SEISMIC Ie = 1.5
      SITE CLASS D (PER IBC 1615.1.1 DEFAULT)
      Sds = 0.661g Sd1 = 0.336g
      SEISMIC DESIGN CATEGORY D
      BASE SHEAR CALCULATED FOR RIGID NON-BUILDING STRUCTURE PER ASCE 7-05 SECTION 15.4.2.

**CONCRETE AND REINFORCING STEEL:**

1. CONCRETE CONSTRUCTION SHALL CONFORM TO ACI 318-08 AND THE 2009 INTERNATIONAL BUILDING CODE AS AMENDED BY THE STATE OF OREGON.
2. THE MINIMUM 28 DAY CONCRETE STRENGTHS SHALL BE AS FOLLOWS:

   f'c = 3000 PSI..... FOR ALL USES UNLESS NOTED OTHERWISE
   f'c = 1000 PSI..... LEAN CONCRETE FILL

3. CONCRETE MIX DESIGNS, ALONG WITH TEST DATA AS REQUIRED, SHALL BE SUBMITTED BY THE CONTRACTOR AN ADEQUATE AMOUNT OF TIME PRIOR TO CONCRETE POURS. ALL HORIZONTALLY EXPOSED SURFACES SHALL HAVE MIX DESIGNS SUBMITTED WITH AN AIR ENTRAINMENT ADMIXTURE INCLUDED.
4. A 20% MAXIMUM OF THE CEMENT CONTENT MAY BY SUBSTITUTED WITH FLYASH CONFORMING TO ASTM C618, TYPE F OR C. HIGHER PERCENTAGES OF FLYASH MAY BE UTILIZED WITH ACCEPTANCE AND APPROVAL BY THE STRUCTURAL ENGINEER. ANY CONCRETE MIX UTILIZING FLYASH SHALL BE VERIFIED WITH TEST DATA.
5. ADDITIONAL WATER SHALL NOT BE ADDED TO THE CONCRETE MIX AT THE JOBSITE. WATER REDUCING ADMIXTURES CONFORMING TO ASTM C494 MAY BE UTILIZED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
6. IF CONCRETE IS TO BE POURED AGAINST AN EXISTING CONCRETE SURFACE, THE EXISTING SURFACE SHALL BE CLEANED AND ROUGHENED TO A MIN. 1/4" AMPLITUDE.
7. SLEEVES, OPENINGS, CONDUITS, AND OTHER EMBEDDED ITEMS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER BEFORE POURING. CONDUITS EMBEDDED IN SLABS SHALL NOT BE LARGER IN OUTSIDE DIAMETER THAN ONE THIRD THE THICKNESS OF THE SLAB AND SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS ON CENTER. PROVIDE 3/4" CHAMFERS ON ALL EXPOSED CONCRETE EDGES UNLESS NOTED OTHERWISE.
8. REINFORCING STEEL:
   A. REINFORCING STEEL SHALL BE DETAILED, FABRICATED, AND INSTALLED ACCORDING TO THE "MANUAL OF STANDARD PRACTICE OF REINFORCED CONCRETE CONSTRUCTION" BY THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).
   B. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60 OR WELDABLE ASTM A706 GRADE 60.
   C. SMOOTH BARS OR WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
   D. REINFORCING STEEL REQUIRING WELDING OR PLACED WITHIN A SPECIFIED BOUNDARY ELEMENT OR MOMENT FRAME ELEMENT SHALL CONFORM TO WELDABLE ASTM A706.
   E. ALL LAP SPLICES OF REINFORCEMENT SHALL CONFORM TO CLASS B LAPS AS SHOWN ON THE LAP SPLICE SCHEDULE PER THIS SHEET UNLESS NOTED OTHERWISE.
   F. ANY MECHANICAL BAR SPLICES SHOWN SHALL BE MADE WITH DAYTON BAR-GRIP COUPLERS OR WITH AN APPROVED PRODUCT SUBMITTED WITH AN ICC REPORT.
   G. UNLESS NOTED OTHERWISE, REINFORCING STEEL SHALL HAVE THE MINIMUM COVER OR PROTECTION FOR THE FOLLOWING USES AS NOTED BELOW:

      SLABS 1"
      FOOTINGS 3"

9. ADDITIONAL CONCRETE ITEMS
   A. HEADED SHEAR STUDS AND DEFORMED BAR ANCHORS SHALL BE AN APPROVED NELSON PRODUCT OR APPROVED EQUAL.
   B. WEDGE ANCHORS OR EXPANSION BOLTS SHALL BE HILTI KB-TZ OR AN APPROVED EQUAL SUBMITTED WITH ICC REPORTS TO THE ENGINEER FOR REVIEW.
   C. EPOXY ANCHORS OR DOWELS SHALL BE INSTALLED WITH HILTI HIT-RE 500-SD EPOXY IN CONCRETE.
   D. UNLESS NOTED OTHERWISE, PERMANENTLY EXPOSED EMBEDDED PLATE AND ANGLE ASSEMBLIES SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. WELDS OR LOADS SHALL NOT BE PLACED ON THE EMBEDDED ASSEMBLIES FOR A MINIMUM OF (7) DAYS AFTER CASTING IN CONCRETE.

# SPECIAL INSPECTION PROGRAM

**TABLE 1**
**REQUIRED STRUCTURAL SPECIAL INSPECTIONS**

| SYSTEM or MATERIAL | INSPECTION | | | | REMARKS |
|---|---|---|---|---|---|
| | IBC CODE REFERENCE | CODE or STANDARD REFERENCE | FREQUENCY | | |
| | | | Continuous | Periodic | |
| **POST INSTALLED CONCRETE ANCHORS** | | | | | |
| INSPECTION OF ANCHORS INSTALLED IN HARDENED CONCRETE | 1912.1 | ICC EVALUATION REPORT ACI 318: 3.8.6, 8.1.3, 21.1.8 | | X | SPECIAL INSPECTIONS APPLY TO ANCHOR PRODUCT NAME, TYPE, AND DIMENSIONS, HOLE DIMENSIONS, COMPLIANCE WITH DRILL BIT REQUIREMENTS, CLEANLINESS OF THE HOLE AND ANCHOR, ADHESIVE EXPIRATION DATE, ANCHOR/ADHESIVE INSTALLATION, ANCHOR EMBEDMENT, AND TIGHTENING TORQUE |

SPECIAL INSPECTION FOOTNOTES

SPECIAL INSPECTIONS SHALL CONFORM TO CHAPTER 17 OF THE 2009 "INTERNATIONAL BUILDING CODE" AND OREGON AMENDMENTS. REFER TO TABLE 1 FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.

SPECIAL INSPECTIONS AND ASSOCIATED TESTING SHALL BE PERFORMED BY AN APPROVED ACCREDITED INDEPENDENT AGENCY MEETING THE REQUIREMENTS OF ASTM E329 (MATERIALS), ASTM D3740 (SOILS), ASTM C1077 (CONCRETE), ASTM A880 (STEEL), AND ASTM E543 (NON-DESTRUCTIVE). THE INSPECTION AND TESTING AGENCY SHALL FURNISH TO THE STRUCTURAL ENGINEER A COPY OF THEIR SCOPE OF ACCREDITATION. SPECIAL INSPECTORS SHALL BE CERTIFIED BY THE BUILDING OFFICIAL. WELDING INSPECTORS SHALL BE QUALIFIED PER SECTION 6.1.4.1.1 OF AWS D1.1. THE OWNER SHALL SECURE AND PAY FOR SERVICES OF THE INSPECTION AND TESTING AGENCY TO PERFORM ALL SPECIAL INSPECTIONS AND TESTS.

THE SPECIAL INSPECTOR SHALL OBSERVE THE INDICATED WORK FOR COMPLIANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS. ALL DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, NOTED IN THE INSPECTION REPORTS, AND IF NOT CORRECTED, THEY SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER AND THE BUILDING OFFICIAL.

THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS FOR EACH INSPECTION TO THE BUILDING OFFICIAL, STRUCTURAL ENGINEER, CONTRACTOR, AND OWNER. THE SPECIAL INSPECTION AGENCY SHALL SUBMIT A FINAL REPORT INDICATING THE WORK REQUIRING SPECIAL INSPECTION WAS INSPECTED AND IS IN CONFORMANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS AND THAT ALL DISCREPANCIES NOTED IN THE INSPECTION REPORTS HAVE BEEN CORRECTED.

# DRAWING INDEX


S0.1 GENERAL STRUCTURAL NOTES, SPECIAL INSPECTION PROGRAM AND DRAWING INDEX

S2.1 PARTIAL PLAN AND DETAILS


02-06-13 100% CD SET

STRUCTURAL REGISTERED PROFESSIONAL ENGINEER OREGON JULY 10, 1981 CLINTON J. AMBROSE
EXPIRES 12-31-13


ABHT STRUCTURAL ENGINEERS

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Title: GEN. STRUCT. NOTES, SPECIAL INSPECTION PROGRAM AND DRAWING INDEX

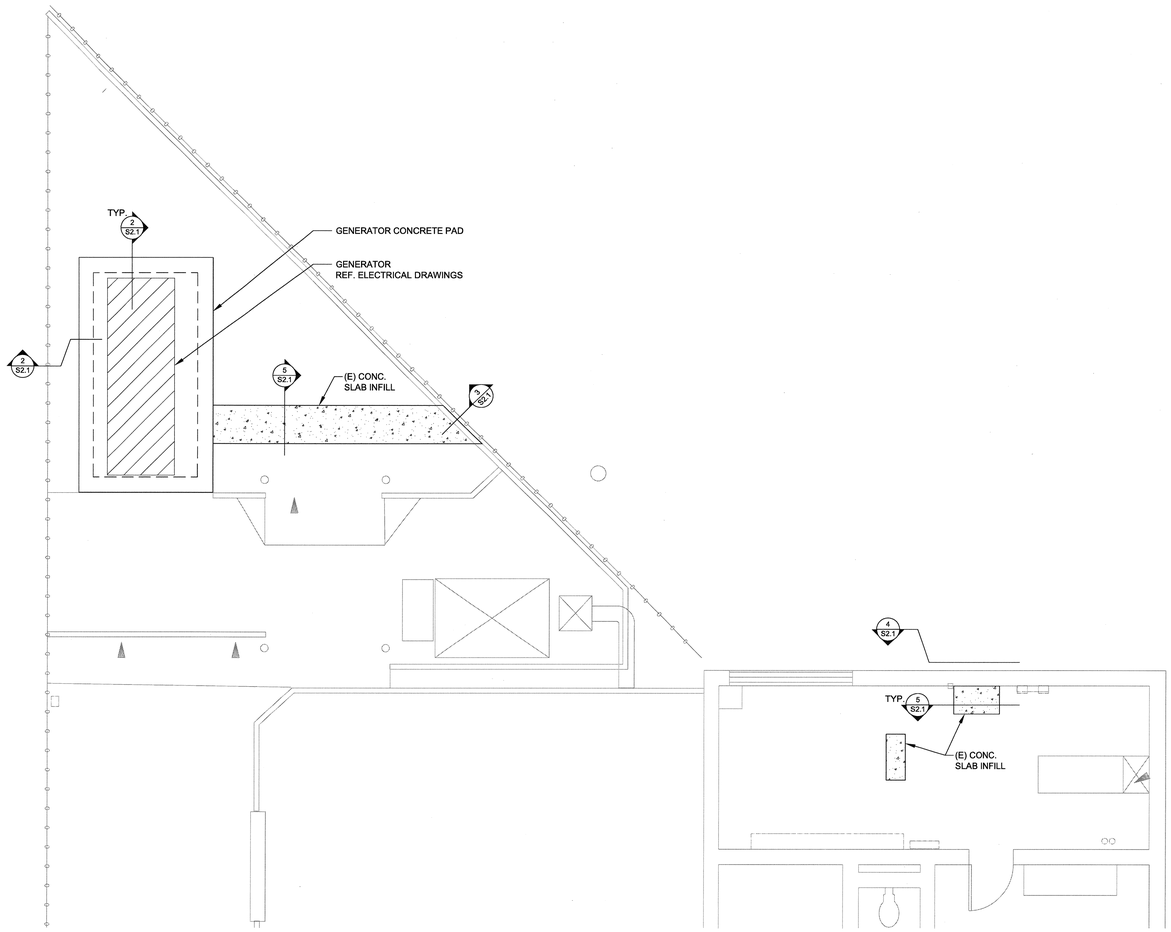
Project: PORTLAND STATE UNIVERSITY - WEST HEATING PLANT GENERATOR ADDITION
724 S.W. HARRISON ST. PORTLAND, OREGON

Revisions:

Drawing No.: S0.1

Scale: NONE

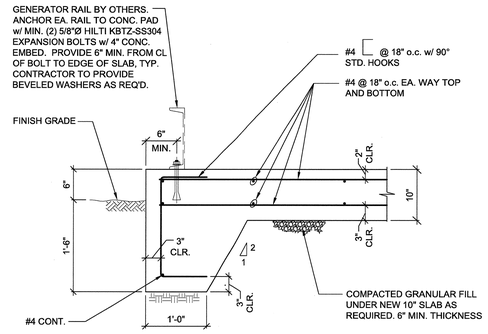
Date: 2/06/13



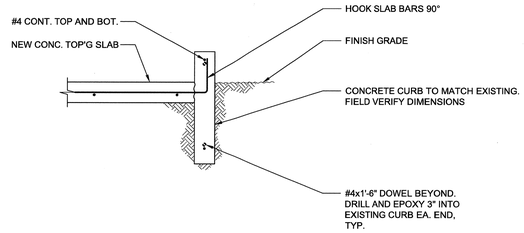

1 PARTIAL PLAN
1/4"=1'-0"

SHEET NOTES:

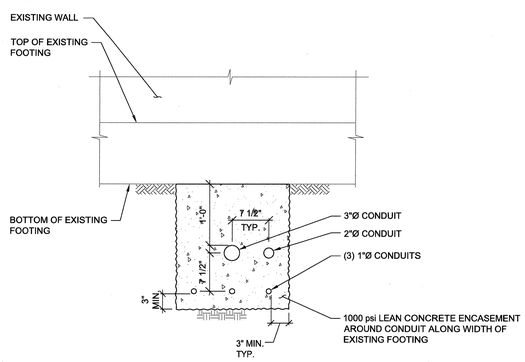
1. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS PRIOR TO FABRICATION AND ERECTION AND SHALL NOTIFY THE ENGINEER OF ANY SIGNIFICANT DISCREPANCIES FROM THE DRAWINGS.
2. COORDINATE ALL DIMENSIONS, SLAB LOCATIONS, DRAINS, SLAB OPENINGS, STEPS, AND CURB ELEVATIONS WITH ELECTRICAL DRAWINGS.
3. REFERENCE ELECTRICAL DRAWINGS FOR SLEEVES, BLOCKOUTS, AND OTHER ITEMS TO BE COORDINATED WITH THE STRUCTURAL DRAWINGS.
4. (E) INDICATES EXISTING.



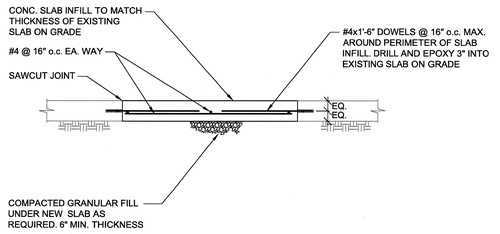

2 GENERATOR PAD DETAIL
1"=1'-0"




3 CURB REPAIR DETAIL
1"=1'-0"




4 CONDUIT ENCASEMENT DETAIL AT EXISTING FOOTING
1"=1'-0"




5 SLAB ON GRADE INFILL
1"=1'-0"

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JULY 15, 1994
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PARTIAL PLAN AND DETAILS

PORTLAND STATE UNIVERSITY - WEST HEATING PLANT
GENERATOR ADDITION
724 S.W. HARRISON ST. PORTLAND, OREGON

Title:
Project:

Revisions:

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**S2**

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