

ELECTRICAL SYMBOLS:

MOTOR STARTER/CONTROLLER (NON-COMBINATION - COMBINATION - MANUAL) RV DENOTES REDUCED VOLTAGE

LOCAL CONTROL PANEL WITH CONTROLLER AND DISCONNECT FURNISHED BY EQUIPMENT VENDOR.

DUPLEX CONVENIENCE RECEPTACLE, 2 POLE, 3 WIRE, 120 VOLTS A.C. 20 AMP RECEPTACLE DESIGNATIONS, FIRST NUMBER DENOTES PANEL, SECOND NUMBER DENOTES CIRCUIT NUMBER. GF-DENOTES GROUND FAULT TYPE. SS-DENOTES SURGE SUPPRESSION TYPE CRE-DENOTES CORROSION RESISTANT AND WEATHER-PROOF.

SINGLE CONVENIENCE RECEPTACLE, 2 POLE, 3 WIRE. REFER TO DRAWINGS FOR AMPERE AND VOLTAGE RATING.

POWER RECEPTACLE, 3 PHASE, 4 WIRE, 480V A.C. WITH DISCONNECT SWITCH. REFER TO DRAWINGS FOR AMPERE RATING.

POWER RECEPTACLE, 2 POLE, 3 WIRE 250 VOLTS A.C. REFER TO DRAWINGS FOR AMPERE RATINGS

WELDING RECEPTACLE

POWER ON-OFF SNAP SWITCH, 1PH, 120V AC, 20A

SINGLE POLE SWITCH - LOWER CASE LETTER DENOTES SWITCHING.

THREE-WAY SWITCH

FOUR-WAY SWITCH

SINGLE POLE MANUAL STARTER

TWO OR THREE POLE MANUAL STARTER, 20A

LETTERS AND NUMERALS INDICATE PANEL AND CIRCUIT NUMBER (LP1-2). CROSS LINES INDICATE NUMBER OF CONDUCTORS. HALF HASH MARKS INDICATES NEUTRAL. NUMBER DENOTES WIRE SIZE WHEN NOT #12 AWG. CONTINUE CONDUIT AND WIRE RUN FROM BOX TO DEVICE IN ROOM OR AREA AS NOTED BY BRANCH CIRCUIT NUMBER #10 AWG WIRING SHALL BE USED FOR RUNS BETWEEN PANEL AND FIRST LIGHTING FIXTURE OR RECEPTACLE EXCEEDING 50 FT, UNLESS OTHERWISE NOTED ON DRAWING.

INDICATES GROUND CONDUCTOR

INDICATES HOMERUN AND CONDUIT TAG. REFER TO ONE LINE AND INTERCONNECTION DIAGRAM

PUSHBUTTON STATION

PUSHBUTTON STATION WITH LOCK-OUT FEATURE

SELECTOR SWITCH

INDICATING LIGHT

CONTROL STATION- REFER TO CONTROL SCHEMATICS AND ONE LINE DIAGRAMS

HAND-OFF-AUTO SELECTOR SWITCH CONTROL STATION

DEVICE LOCATED IN FIELD AT OR NEAR MOTOR

DEVICE LOCATED IN CONTROL PANEL

CONTROL STATION FURNISHED BY EQUIPMENT VENDOR

AMMETER - AMMETER SWITCH

VOLTMETER - VOLTMETER SWITCH

MICROPROCESSOR BASED METERING DEVICE

LINE SWITCH DISCONNECT - UNFUSED OR FUSED F DENOTES FUSING, ONLY WHERE INDICATED. 60 DENOTES SWITCH AMP RATING.

ELECTRICAL MANHOLE

ELECTRICAL HANDHOLE

TELEPHONE HANDHOLE

VARIABLE FREQUENCY DRIVE

JUNCTION BOX SIZE AS REQUIRED BY N.E.C.

TERMINAL BOX SIZE AS REQUIRED BY N.E.C. AND TO ACCOMMODATE ALL TERMINATIONS ON TERMINAL BLOCKS TERMINATIONS INCLUDING SPARE WIRING.

PULL BOX SIZE AS REQUIRED BY N.E.C.

KEY INTERLOCK

ELECTRIC MOTOR (NUMBER INDICATES HORSEPOWER). FOR FANS, MOUNT CONTROL STATION ADJACENT TO FAN, PROVIDE CHANNEL SUPPORT. FOR 120 VOLT BRANCH CIRCUIT MOTORS, NUMERALS DENOTES DISTRIBUTION OR LIGHTING PANEL AND BRANCH CIRCUIT NUMBER.

MOTORIZED VALVE WITH CONTROLLER

GROUND CONNECTION

GROUND TEST POINT

GROUND ROD

GROUND GRID CABLE CONNECTION

GROUND

#4/0 GROUND CABLE BURIED 2'-6" BELOW GRADE

FUSE

PHOTOCCELL

FLUORESCENT LIGHTING FIXTURE - SURFACE OR PENDANT MOUNTED. SEE LIGHTING FIXTURE SCHEDULE FOR TYPE. FIRST NUMERAL DENOTES LIGHTING PANEL (LP1), SECOND NUMBER DENOTES BRANCH CIRCUIT NUMBER. LOWER CASE LETTER DENOTES SWITCHED CIRCUIT.

FLUORESCENT LIGHTING FIXTURE WITH BATTERY PACK.

CEILING OR PENDANT MOUNTED LIGHTING FIXTURE. SEE LIGHTING FIXTURE SCHEDULE FOR TYPE.

CEILING OR PENDANT MOUNTED LIGHTING FIXTURE WITH QUARTZ BACKUP. SEE LIGHTING FIXTURE SCHEDULE FOR TYPE.

WALL/PENDANT MOUNTED EXIT SIGN. TOP LETTERS AND NUMERALS DENOTE TYPE (SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION). BOTTOM NUMBERS DENOTE LIGHTING PANEL NUMBER AND CIRCUIT DESTINATION. SHADED TRIANGLE INDICATES DIRECTION OF EXIT SIGN FACE.

WALL MOUNTED LIGHTING FIXTURE. SEE LIGHTING FIXTURE SCHEDULE FOR TYPE.

POLE OR STANCHION MOUNTED LIGHTING FIXTURE. SEE LIGHTING FIXTURE SCHEDULE FOR TYPE.

TWO (2) POLE OR STANCHION MOUNTED LIGHTING FIXTURES

POLE MOUNTED FIXTURE WITH GF RECEPTACLE

2 LAMP SELF CONTAINED DC EMERGENCY LIGHTING UNIT. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION. LETTER AND NUMERALS DENOTES FIXTURE TYPE.

FIXTURE DESIGNATION SYMBOL. SEE LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND TYPE. ALL FIXTURES SHOWN IN A ROOM WITH THIS SYMBOL SHALL BE OF TYPE INDICATED BY LETTER, NUMBER IN SYMBOL INDICATES LAMP WATTAGE AND NUMBER OF LAMPS WHERE MORE THAN ONE (UNLESS OTHERWISE NOTED). NUMBER BELOW SYMBOL INDICATES MOUNTING HEIGHT ABOVE FINISHED FLOOR OR AS NOTED.

CURRENT TRANSFORMER

POTENTIAL TRANSFORMER

THERMAL-MAGNETIC BREAKER. 3P INDICATES 3 POLE BREAKER. PROVIDE WITH CURRENT LIMITERS WHERE INDICATED ON THE DRAWINGS

MOLDED CASE SWITCH, NON-AUTOMATIC HIGH INSTANTANEOUS ONLY CIRCUIT BREAKER, NUMBER DENOTES FRAME SIZE.

DRAWOUT TYPE POWER CIRCUIT BREAKER WITH RMS TYPE SOLID STATE TRIP PROGRAMMER THAT INCLUDES GROUND FAULT PROTECTION.

CIRCUIT BREAKER WITH RMS TYPE SOLID STATE TRIP PROGRAMMER THAT INCLUDES GROUND FAULT PROTECTION.

AC COMBINATION FULL VOLTAGE NON-REVERSING STARTER WITH MAGNETIC BREAKER. PROVIDE WITH CURRENT LIMITERS WHERE INDICATED ON THE DRAWINGS

AC COMBINATION FULL VOLTAGE NON-REVERSING TWO SPEED TWO WINDING STARTER WITH MAGNETIC BREAKER

AC COMBINATION SOLID STATE REDUCED VOLTAGE NON-REVERSING STARTER WITH MAGNETIC BREAKER PROVIDE WITH CURRENT LIMITERS WHERE INDICATED ON THE DRAWINGS

UNIT HEATER-NUMERAL DENOTES LIGHTING PANEL AND BRANCH CIRCUIT NUMBER

THERMOSTAT

MOTORIZED DAMPER

LOUVER MOTOR

TRANSFORMER- DELTA PRIMARY WITH SOLIDLY GROUNDED WYE SECONDARY. TYPE AND SIZE AS NOTED ON THE THE DRAWINGS AND IN SPECIFICATIONS

LIGHTNING ARRESTER

AIR INTERRUPTER SWITCH WITH FUSING WHERE NOTED

SUBMERSIBLE CABLES BY VENDOR

INDICATES NEW EQUIPMENT/CONDUIT

INDICATES EXISTING EQUIPMENT/CONDUIT

INDICATES CONCEALED OR BELOW GRADE EQUIPMENT/CONDUIT

MICROPROCESSOR METERING DEVICE

INDICATES DEMOLITION WORK

CONDUIT GOING UP

CONDUIT GOING DOWN

INSTRUMENTS:

INSTRUMENT DEVICE, LETTER IDENTIFIES DEVICE FUNCTION, NUMBERS WHERE INDICATED DENOTES LOOP NUMBER

PRESSURE SWITCH (PSH DENOTES PRESSURE SWITCH HIGH AND PSL DENOTES PRESSURE LOW)

CONTROL VALVE

FLOW SWITCH (FSH DENOTES FLOW SWITCH HIGH AND FSL DENOTES FLOW SWITCH LOW)

LIMIT SWITCH

PRESSURE TRANSMITTER (I DENOTES INDICATING TYPE)

LEVEL TRANSMITTER (LE DENOTES LEVEL ELEMENT)

FLOW TRANSMITTER (FE DENOTES FLOW ELEMENT)

LEVEL SWITCH (LSH DENOTES LEVEL SWITCH HIGH AND LSL DENOTES LEVEL SWITCH LOW)

MOTORIZED VALVE

SOLENOID VALVE

STROBE LIGHT

ABBREVIATIONS:

AFF ABOVE FINISH FLOOR

AFG ABOVE FINISHED GRADE

BKR BREAKER

CBV CABLE BY VENDOR, INSTALLED BY CONTRACTOR

CKT CIRCUIT

CNTL CONTROL

CP CONTROL PANEL

CPT CONTROL POWER TRANSFORMER

CT CURRENT TRANSFORMER

DN DOWN

DPDT DOUBLE POLE DOUBLE THROW SWITCH

EHH ELECTRICAL HANDHOLE

EL ELEVATION

EMH ELECTRICAL MANHOLE

EXP EXPLOSION PROOF

EXIST EXISTING

FDR FEEDER

FVNR FULL VOLTAGE NON-REVERSING

GND OR G GROUND

HOA HAND-OFF-AUTOMATIC

JB JUNCTION BOX

LA LIGHTNING ARRESTOR

LCP LOCAL CONTROL PANEL

LTG LIGHTING

MCC MOTOR CONTROL CENTER

NA NON-AUTOMATIC

NCTC NORMALLY CLOSED, TIMED TO CLOSE

NOTC NORMALLY CLOSED, TIMED TO OPEN

NOTC NORMALLY OPEN, TIMED TO CLOSE

NOTO NORMALLY OPEN, TIMED TO OPEN

NTS NOT TO SCALE

PB PULL BOX

PFD PULL FUSE DISCONNECT

PNL PANEL

PT POTENTIAL TRANSFORMER

RECEP RECEPTACLE

RVNR REDUCED VOLTAGE NON-REVERSING

(S) (SH) SHIELDED CABLE

SP SPARE

SC SCADA

SS SELECTOR SWITCH

SWGR SWITCHGEAR

WP WEATHERPROOF

XFMR TRANSFORMER

N.E.C. NATIONAL ELECTRIC CODE

(TYP) TYPICAL

SHT. OR SH. SHEET

GENERAL NOTES:

- THE SYMBOLS AND ABBREVIATIONS LIST ON THIS SHEET IS A COMPREHENSIVE STANDARD GUIDE INTENDED FOR GENERAL USE ON ALL PROJECTS. THEREFORE NOT ALL THE SYMBOLS AND ABBREVIATIONS CONTAINED IN THIS LIST ARE NECESSARILY USED ON THIS PARTICULAR PROJECT AND SHOULD BE USED FOR CLARIFICATION ONLY.
- ALL DUCT BANK ROUTING SHOWN IS DIAGRAMMATICAL, FINAL LOCATION TO BE VERIFIED IN THE FIELD. ALL CONDUITS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 16111 AND 16112.
- ALL MATERIALS AND EQUIPMENT SHALL CONFORM TO THE AREA CLASSIFICATION INDICATED. MATERIALS, EQUIPMENT AND INCIDENTALS IN AREAS IDENTIFIED AS WET, CORROSIVE OR HAZARDOUS SHALL MEET NEC AND NEMA REQUIREMENTS FOR THE LOCATION NOTED. WET AND CORROSIVE (NEMA 4X), HAZARDOUS (CLASS AND DIVISION DESIGNATED). INDOOR AREA DESIGNATIONS FOR CORROSIVE AND HAZARDOUS LOCATIONS ARE INDICATED ON THE DRAWINGS. ALL INDOOR AREAS NOT DESIGNATED AS CORROSIVE OR HAZARDOUS SHALL BE CONSIDERED DUSTY. MATERIALS, EQUIPMENT AND INCIDENTALS FOR DUSTY LOCATIONS SHALL MEET NEMA 12 REQUIREMENTS.
- PROVIDE EXPANSION AND DEFLECTION FITTINGS FOR CONDUITS PASSING THROUGH STRUCTURAL EXPANSION JOINTS.
- PROVIDE JUNCTION BOX FOR ANY DEVICE WITH PIG TAIL SUCH AS SOLENOID VALVES, LIMIT SWITCHES, SMOKE DETECTORS ETC. FOR PROPER ELECTRICAL CONNECTION, PROVIDE ALL HARDWARE FOR MOUNTING OF JUNCTION BOX.
- CONTRACTOR SHALL PROVIDE SUITABLE, PERMANENT AND LEGIBLE LAMINATED PLASTIC NAMEPLATES AND WARNING SIGNS ON ALL ELECTRICAL OPERABLE EQUIPMENT AS REQUIRED OR AS DIRECTED BY THE ENGINEER.
- CONDUIT DESIGNATIONS:
 - CONDUIT TAGS PREFIXED BY THE LETTER C: NEW CONDUIT AND WIRES.
 - CONDUIT TAGS PREFIXED BY THE LETTERS EC: NEW WIRES TO BE INSTALLED IN EXISTING CONDUIT. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL WIRES FROM CONDUITS IDENTIFIED BY THE LETTERS EC.
 - CONDUIT TAGS PREFIXED BY THE LETTERS TP: NEW TEMPORARY POWER WIRING AS SHOWN ON THE DRAWINGS.
- CONDUIT AND CABLE SCHEDULE:
 - REFER TO ONE LINE, INTERCONNECTION DIAGRAMS AND SH. E-27 FOR CONDUIT AND WIRE SIZES.
- TEMPORARY POWER:
 - PROVIDE TEMPORARY POWER AND LIGHT FOR CONSTRUCTION PURPOSES IN ACCORDANCE WITH SPEC SECTION 01510.
 - PROVIDE TEMPORARY POWER FOR EXISTING MCC'S AND PANELS AS SHOWN ON THE DRAWINGS.
 - TEMPORARY POWER WIRING SHALL BE PROVIDED IN ACCORDANCE WITH ARTICLE 305 OF THE N.E.C.
- SEE BAF MANUFACTURER'S SHOP DRAWINGS FOR SCOPE OF EQUIPMENT, CONDUIT AND WIRES TO BE PROVIDED BY BAF MANUFACTURER.

REVISIONS				REMARKS
NO.	BY	DATE	DESCRIPTION	
1	ARB	JAN. 2000	RECORD DRAWING	

DES: GJM/TK
DWN: GJM/TK
CKD: TK



CITY OF ROANOKE, VIRGINIA
WATER POLLUTION
CONTROL PLANT
UPGRADE AND EXPANSION

ELECTRICAL
LEGEND

SCALE: NONE