SYMBOL LEGEND

(NOT ALL SYMBOLS WILL APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
	EXISTING
	REMOVE
	NEW WORK
	HIDDEN OR BURIED
	HOMERUN CONDUIT – GROUND, PHASE, SWITCHED, NEUTRAL, ISOLATED GROUND
	FLEXIBLE CONDUIT
	CONDUIT TURNING DOWN
	CONDUIT TURNING UP
	CONDUIT UP AND DOWN
	CONDUIT SEAL
	CONDUIT CAP
480V 800A	BUSWAY WITH DESCRIPTION
	GROUNDING CONDUCTOR
8 X 24	CABLE TRAY WITH DESCRIPTION
	CEILING JUNCTION BOX
	WALL JUNCTION BOX
	DUPLEX RECEPTACLE OUTLET
	SINGLE RECEPTACLE OUTLET
	DOUBLE DUPLEX RECEPTACLE OUTLET
GFCI WP	GROUND FAULT CIRCUIT INTERUPTER DUPLEX OUTLET WITH WEATHERPROOF COVER
	SPLIT WIRED DUPLEX RECEPTACLE
IG	DUPLEX ISOLATED GROUND
A	SPECIAL PURPOSE OUTLET – USE SUBSCRIPT TO IDENTIFY TYPE IN SPECS
A	FLOOR RECEPTACLE OUTLET USE SUBSCRIPT TO IDENTIFY TYPE IN SPECS
	RECEPTACLE RACEWAY
$\$_a$	SINGLE POLE SWITCH – USE SUBSCRIPT TO DESIGNATE CONTROL OF PARTICULAR OUTLETS
$\$_2$	DOUBLE POLE SWITCH
$\$_3$	THREE-WAY SWITCH
$\$_4$	FOUR-WAY SWITCH
$\$_{WP}$	WEATHERPROOF SWITCH
$\$_K$	KEY OPERATED SWITCH
600	DIMMER SWITCH – NUMBER INDICATES WATTAGE
	OCCUPANCY SENSING SWITCH
	PHOTOCELL
BL 30	REMOTE CONTROL SWITCH 6 POLE, 30 AMPS
A 1, b	FLUORESCENT LIGHT FIXTURE A=FIXTURE TYPE 1=CIRCUIT NUMBER b=SWITCH CONTROLLING FIXTURE
	FLUORESCENT STRIP FIXTURE
	WALL MOUNTED FLUORESCENT FIXTURE
	CEILING MOUNTED LIGHT FIXTURE
	WALL MOUNTED INCANDESCENT FIXTURE
	EMERGENCY LIGHT FIXTURE

SYMBOL	DESCRIPTION
	LIGHT POLE WITH FIXTURE
	EMERGENCY LIGHT FIXTURE RECHARGEABLE TYPE
	CEILING MOUNTED EXIT SIGN – ARROW AS INDICATED
	TWO FACED EXIT SIGN
	WALL MOUNTED EXIT SIGN
	SWITCHBOARD, POWER PANELBOARD
LP–XX	LIGHTING PANELBOARD
T	TRANSFORMER
30	NON-FUSIBLE SAFETY SWITCH (NUMBER INDICATES SWITCH SIZE)
40/60 F	FUSED SAFETY SWITCH (NUMBERS INDICATE FUSE/SWITCH SIZES)
2 20	COMBINATION MAGNETIC STARTER AND CIRCUIT BREAKER 2 – INDICATES NEMA STARTER SIZE 20 – INDICATES CIRCUIT BREAKER TRIP
2	MAGNETIC STARTER
3	MOTOR (NUMBER INDICATES HP)
	BELL
H	HORN "H" OR SIREN "S"
	BUZZER
	PUSHBUTTON
F	MANUAL PULL STATION
V	FIRE ALARM HORN (V=VISUAL SIGNAL)
P	PHOTOELECTRIC SMOKE DETECTOR
I	IONIZATION SMOKE DETECTOR
T	THERMAL DETECTOR
P D	DUCT SMOKE DETECTOR (PHOTOELECTRIC)
DH	MAGNETIC DOOR HOLDER
PS	PRESSURE SWITCH
FS	FLOW SWITCH
S	VALVE SUPERVISORY SWITCH
FACP	FIRE ALARM CONTROL PANEL
F	FIRE ALARM RACEWAY
S	CEILING SPEAKER
S	WALL SPEAKER
	TELECOMMUNICATIONS OUTLET
	FLOOR MOUNTED TELECOMMUNICATIONS OUTLET
	INTERCOM OUTLET
T	TELECOMMUNICATIONS RACEWAY
D	PROTECTED TRANSMISSION SYSTEM (PTS) DATA TERMINAL CONNECTION
CR	CARD READER
ES	ELECTRIC DOOR STRIKE
DC	DOOR CONTACTS
RAP	REMOTE ACCESS PANEL
HG	HAND GEOMETRY UNIT
MD	MOTION DETECTOR
C	CLOSED CIRCUIT TV CAMERA

SYMBOL	DESCRIPTION
100/3	MEDIUM VOLTAGE DISCONNECT SWITCH
600	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER
480V, 500 KVA, 208Y/120V	TRANSFORMER (DELTA-WYE CONN.)
	SHIELDED TRANSFORMER
1000/1600	DRAWOUT CIRCUIT BREAKER (TRIP/FRAME)
300/400	CIRCUIT BREAKER (TRIP/FRAME)
7 MCP	MOTOR CIRCUIT PROTECTOR
	FUSE
	FUSIBLE ELEMENT
	FUSIBLE DISCONNECT SWITCH
	GROUND
G	GENERATOR
3000/5 3	CURRENT TRANSFORMER (NUMBERS INDICATE RATIO AND QUANTITY)
3	POTENTIAL TRANSFORMER (NUMBER INDICATES QUANTITY)
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
V	VOLTMETER
A	AMMETER
KW	KILOWATT METER
N E L	AUTOMATIC TRANSFER SWITCH
K1	KEY INTERLOCK #1
	BATTERY
	NORMALLY CLOSED CONTACT
	NORMALLY OPEN CONTACT
	PROTECTIVE RELAY, SOLENOID COIL
	THERMAL OVERLOAD
	CONNECTION
	CROSS, NO CONNECTION
	SURGE ARRESTOR
	CAPACITOR
CR1	CONTROL RELAY #1
	BUS PLUG CIRCUIT BREAKER
T	THERMOSTAT
1	KEYED NOTE DESIGNATION
3	ELECTRICAL EQUIPMENT DESIGNATION
6	MECHANICAL EQUIPMENT DESIGNATION
7	NAMEPLATE DESIGNATION
WP	WEATHERPROOF
AFF	ABOVE FINISH FLOOR

GENERAL NOTES

1. PERFORM THE ENTIRE INSTALLATION IN ACCORDANCE WITH THE CURRENT RULES OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA), AND APPLICABLE DOE ORDERS. EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL).

2. PROVIDE AND MAINTAIN A CLEAR WORKING SPACE ABOUT ELECTRIC EQUIPMENT (SWITCHBOARDS, PANELBOARDS, ETC.) IN ACCORDANCE WITH NEC ARTICLES 110.26 AND 110.34.

3. USE 600 VAC CIRCUIT BREAKERS IN 480V AND 480Y/277V SWITCHBOARDS, PANELBOARDS AND MOTOR CONTOL CENTERS.

4. PROVIDE CIRCUIT BREAKERS WITH UL LISTED INTERRUPTING RATING (RMS SYMMETRICAL AMPERES) GREATER THAN THE AVAILABLE FAULT CURRENT SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM.

5. PROVIDE PADLOCKING PROVISIONS FOR EACH TWO- AND THREE-POLE CIRCUIT BREAKER.

6. BOND RACEWAYS AND THE FRAMES AND ENCLOSURES OF MOTORS, BREAKERS, SWITCHES, AND OTHER ELECTRICAL EQUIPMENT TO THE BUILDING GROUNDING SYSTEM. INSTALL AN INSULATED EQUIPMENT GROUND CONDUCTOR IN EACH RACEWAY OR CONDUIT. SIZE EQUIPMENT GROUND CONDUCTOR IN ACCORDANCE WITH NEC TABLE 250.66.

7. IDENTIFY NEW BRANCH CIRCUITS AT THE PANEL AND AT THE LOAD OUTLET, RECEPTACLE AND SWITCH. IDENTIFY THE PURPOSE OF INDIVIDUAL CIRCUIT BREAKERS. SAFETY SWITCHES AND MOTOR STARTERS BY MEANS OF NAMEPLATES AS INDICATED.

8. ROUTE CONDUITS TO SUIT EQUIPMENT AND BUILDING STRUCTURE. LIMIT THE USE OF ELECTRICAL METALLIC TUBING (EMT) TO AREAS WHERE IT WILL NOT BE SUBJECT TO PHYSICAL DAMAGE OR CORROSION. USE INTERMEDIATE METAL CONDUIT (IMC) OR RIGID GALVANIZED STEEL CONDUIT (RGS) FOR WORK EMBEDDED IN CONCRETE OR EXPOSED TO PHYSICAL DAMAGE. USE MINIMUM 3/4 INCH CONDUIT EXCEPT AS FOLLOWS: 1/2" CONDUIT MAY BE USED FOR 20 AMP GENERAL LIGHT AND POWER CIRCUITS AND FOR CONTROL CIRCUITS; 3/8" FLEXIBLE METAL CONDUIT MAY BE USED TO CONNECT LIGHT FIXTURES IN SUSPENDED CEILINGS. USE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FLEXIBLE CONNECTIONS TO EQUIPMENT IN MECHANICAL ROOMS OR OUTDOORS.

9. SEAL AROUND CONDUIT PENETRATIONS THROUGH INTERIOR WALLS AND FLOORS SEPARATING AREAS TO RESTORE ORIGINAL FIRE RATING; USE A UL CLASSIFIED FIRE SEALANT. SEAL PENETRATIONS THROUGH ROOF AND EXTERIOR WALLS TO MAKE WATERPROOF. REQUEST INSPECTION OF FIRE SEALS BY ELECTRICAL INSPECTOR FROM AUTHORITY HAVING JURISDICTION BEFORE AND AFTER PLACEMENT OF FIRE SEAL MATERIALS.

10. USE 12 AWG OR LARGER CONDUCTORS FOR POWER WIRING. USE 14 AWG STRANDED CONDUCTORS FOR CONTROL WIRING UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS.

11. USE ONLY COPPER CONDUCTORS ON CIRCUITS 600V AND LESS. CONDUCTORS 10 AWG AND SMALLER SHALL BE SOLID AND 8 AWG AND LARGER AWG SHALL BE STRANDED. PROVIDE TYPE THHN/THWN WIRE INSULATION; XHHW INSULATION MAY BE USED FOR 1 AWG AND LARGER.

12. USE THE FOLLOWING CONDUCTOR COLOR CODES:

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

ISOLATED GROUND SHALL BE GREEN WITH YELLOW TRACER.

13. ARRANGE CONNECTIONS FOR SINGLE PHASE CIRCUITS TO ACHIEVE THREE PHASE LOAD BALANCE WITHIN 20% OF THE AVERAGE PHASE LOAD CURRENT. UNGROUNDED CONDUCTORS USING A COMMON NEUTRAL MUST ORIGINATE FROM DIFFERENT PHASES.

14. INSTALL OUTDOOR EQUIPMENT TO BE WEATHERPROOF AND TO EXCLUDE BIRDS AND RODENTS WITH MAXIMUM 1/2" DIAMETER UNPROTECTED OPENINGS IN ENCLOSURES.

15. ITEMS DESIGNATED BY A NUMBER IN A HEXAGON ARE DESCRIBED IN THE ELECTRICAL EQUIPMENT LIST. ITEMS DESIGNATED BY A NUMBER IN A DIAMOND ARE DESCRIBED IN THE MECHANICAL EQUIPMENT LIST. NAMEPLATES ARE DESIGNATED BY A NUMBER IN A RECTANGLE AND ARE DESCRIBED IN THE NAMEPLATE SCHEDULE.

16. PROVIDE LIGHTNING PROTECTION IN ACCORDANCE WITH NFPA 780. PROVIDE MATERIAL THAT IS UL LABELED FOR LIGHTNING PROTECTION SERVICE. THE LIGHTNING PROTECTION SYSTEM DESIGN AND INSTALLATION SHALL FOLLOW THAT SHOWN ON THE DRAWINGS.

17. ELECTRICAL EQUIPMENT SPECIFIED IN THIS DOCUMENT SHALL BE ACCEPTANCE TESTED AND INSPECTED BY THE LANL SUPPORT SERVICES SUB-CONTRACTOR.

18. ELECTRICAL MATERIALS AND CONSTRUCTION SHALL CONFORM TO LOS ALAMOS NATIONAL LABORATORY STANDARD CONSTRUCTION SPECIFICATIONS WHERE APPLICABLE.

19. DISPOSE OF ITEMS REMOVED AS DIRECTED BY THE LANL CONSTRUCTION INSPECTOR.

20. REPAIR AREAS DAMAGED DURING CONSTRUCTION TO MATCH ADJACENT AREAS WITH RESPECT TO BOTH COLOR AND FINISH.

21. KEEP JOB SITE IN AN ORDERLY CONDITION AND AT PROJECT COMPLETION. REMOVE ALL WASTE. LEAVE THE JOB SITE IN A CONDITION ACCEPTABLE TO THE LANL CONSTRUCTION INSPECTOR.

22. IF A CONFLICT ARISES BETWEEN THE FIELD CONDITIONS AND THESE GENERAL ELECTRICAL REQUIREMENTS, CONTACT THE LANL PROJECT LEADER FOR DIRECTIONS.

23. TIE-INS TO EXISTING POWER SYSTEMS WILL BE PERFORMED BY THE LANL SUPPORT SERVICES SUB-CONTRACTOR.

DESIGNER:
EDIT AND/OR MODIFY GENERAL NOTES TO BE PROJECT SPECIFIC.

DO NOT USE THESE GENERAL NOTES ON PROJECTS WITH FORMAL SPECIFICATIONS.

NOT FOR CONSTRUCTION

NO	DATE	CLASS REV	DESCRIPTION	DWN	VER	CHKD	SUB	APP
1	11-19-02		NEW DRAWING NO. CORRECTED LAYERS, ADDED 3 SYMBOLS, UPDATED NOTES. REPLACES ST7001	SB	DP	DW	DP	TO

FACILITY & WASTE OPERATIONS
SYSTEMS ENGINEERING & MAINTENANCE

LANL ENGINEERING MANUAL

ELECTRICAL SYMBOL LEGEND AND GENERAL NOTES

DRAWN	D.W. POWELL
DESIGN	D.W. POWELL
CHECKED	D. WITHERELL
DATE	08-21-02

BLDG. TA–

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SHEET OF

CLASSIFICATION UNC | REVIEWER LARRY BAYS | DATE

PROJECT ID: CHAPTER 7 | DRAWING NO: ST-D5000-1 | REV: 1