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PLAN SYMBOLS

- RACEWAY EXPOSED, INCLUDING WITHIN PLENUMS, HUNG CEILING SPACES AND BELOW PLATFORMS.
- RACEWAY CONCEALED IN WALL, CEILING, BURIED IN EARTH OR EMBEDED IN CONCRETE.
- WIRING BURIED IN EARTH OR EMBEDDED IN CONCRETE.
- VISIBLE, EXTENSION, PROJECTION, OR BACKGROUND.
- HIDDEN BACKGROUND.
- CENTER LINE.
- FLEXIBLE RACEWAY.
- BOUNDARY OR MATCH LINE.
- FLUSH GROUNDING SPOOL IN GROUND SYSTEM.
- LIGHTNING PROTECTION AIR TERMINAL.
- EXOTHERMIC WELD IN GROUND SYSTEM. BRAZING CLAMPING, BOLTING, OR WEDGING SHALL NOT BE USED.
- GROUND ROD IN GROUND SYSTEM.
- GROUND WELL FOR PAVED AREA
- GROUND WELL FOR UNPAVED AREA
- CONDUIT CAPPED.
- BREAK IN LINE FOR DRAFTING CLARITY.
- WIRING UP, CONTINUED IN ANOTHER VIEW
- WIRING DOWN TO ENCLOSURE OR CONTINUED IN ANOTHER VIEW.
- (HIGHER) (LOWER) WIRING DOWN IN SAME VIEW, CHANGING ELEV.
- CONDUIT SEALING FITTING, UL LABELED.
- JUNCTION BOX, PULL BOX, OR CONDUIT BODY, UL LABELED. FIELD SIZED PER NEC CODE. (NOTE 9)
- J — ENGINEERED BOX. J=JUNCTION BOX, P=PULL BOX, T=TERMINAL BOX, UL LABELED. SIZE AND FUNCTION AS SHOWN ON PLAN (H X W X D).
- CROSS MARKS INDICATE NUMBER OF #10 AWG (OR AS NOTED ON DWG) CONDUCTORS, INCLUDING NEUTRALS AND GREEN INSULATED GROUND WIRES.
- 3/4"C, 8#10, LP01-1, 3, 5 & 7 — HOME RUN TO CIRCUIT BREAKER PANEL. SHOWN MULTIPLE CIRCUIT 1, 3, 5 AND SEPARATE CIRCUIT 7 OF PANEL LP01.
- (2)-1"C-5 #10 & 2 # 10 GND. — WIRING RUN IDENTIFICATION: SHOWN AS TWO CONDUITS EACH BEING ONE INCH GRS CONTAINING 5 #10 AWG THWN CONDUCTORS AND 2# 10 (GREEN) GROUND WIRES
- 3/4"C, 4#12 & 1#12 GND. RP01-1/3/5 — THREE PHASE CIRCUIT WITH DEDICATED NEUTRAL AND GROUND, PANEL RP01, CIRCUITS 1, 3 AND 5
- SURFACE MOUNT PANEL BOARD AS IDENTIFIED ON SINGLE LINE DIAGRAM AND IN PANEL SCHEDULE, UL LABELED.
- RECESSED MOUNTED PANEL BOARD AS IDENTIFIED ON SINGLE LINE DIAGRAM AND IN PANEL SCHEDULE, UL LABELED
- POWER PANEL
- CONTROL PANEL.
- SIGNAL OR COMMUNICATIONS CABINET AS IDENTIFIED ON PLAN. IP = INSTRUMENT PANEL. FP = FIRE ALARM PANEL.
- TELEPHONE TERMINAL CABINET.
- EMERGENCY BATTERY CABINET.
- SURFACE METAL RACEWAY AS IDENTIFIED ON PLAN, UL LABELED. NEMA #5-20R, 2P, 3W, 20A RECEPTACLES UNLESS OTHERWISE IDENTIFIED.
- MOTOR CONTROL CENTER OR SWITCHGEAR. SHOWN INCLUDING SPACE FOR FUTURE CUBICLE.
- CABLE TRAY, SIZE AND SHAPE IDENTIFICATION PER NEMA STANDARD VE1-1984.
- F 30A 3W 4P — SWITCH, NEMA 1 ENCLOSED UON, HORSEPOWER RATED DISCONNECT, UL LABELED. THREE WIRE FOUR POLE SHOWN. F = FUSED, NF= NON-FUSED; A=AMPERES CONTINUOUS RATING, W = WIRE, P = POLE
- 1 — MANUAL MOTOR STARTER, NEMA 1 ENCLOSED UON, UL LABELED.
- 1 — MAGNETIC CONTACTOR, NEMA 1 ENCLOSED UON, UL LABELED.
- 1 — MAGNETIC MOTOR STARTER, FULL LOAD NON-REVERSING, NEMA 1 ENCLOSED UON, UL LABELED.
- 1 — REVERSING MAGNETIC MOTOR STARTER, NEMA 1 ENCLOSED UON, UL LABELED.

PLAN SYMBOLS

- (HORIZ) OR (VERT) OR — MOTOR, SHOWING ORIENTATION OF TERMINAL BOX AND EQUIPMENT TAG NUMBER. REFER TO MOTOR CONTROL CENTER DRAWINGS. W-CS-XXX-P-01
- CENTERLINE OF SUPPORT ATTACHED TO STEEL COLUMN.
- $S_{a,b}$ — (2) SWITCHES-SINGLE POLE EACH, WITH COVER AND 2-GANG BOX. MOUNTED +4'-0" UON SWITCH LEGS a & b. TO MASTER FIXTURE
- $D_{3a,b}$ — DIMMER WITH COVER AND ENCLOSURE, MOUNTED +4'-0" UNLESS OTHERWISE NOTED. a, b, c, ETC = OUTLETS SWITCHED. 3=THREE WAY
- S_{3WPa} — SWITCH, SINGLE POLE, WITH COVER AND ENCLOSURE, MOUNTED +4'-6" UNLESS OTHERWISE NOTED. 2 = TWO POLE. 3 = THREE WAY. 4 = FOUR WAY. a, b, c, ETC = OUTLETS SWITCHED. EP = EXPLOSION-PROOF. K = KEY OPERATED. WP = WEATHERPROOF
- TRACK LIGHTING FIXTURE
- WALL MOUNTING FIXTURE SEE PLAN FOR TYPE
- E — EMERGENCY LIGHTING UNIT. (SELF CONTAINED). TRANSFER TYPE
- FLOOD OR SPOT LIGHT. SHOWN WALL BRACKET MOUNTED. INCLUDING JUNCTION BOX WITH COVER. AP = AIMING POINT. AG = ABOVE GRADE. OG= ON GRADE. OW= ON WALL.
- 6a — METAL HALIDE LIGHT FIXTURE FOR GLOBE TYPE LAMPS AS IDENTIFIED ON PLANS OR SCHEDULES. SUBSCRIPT INDICATES CIRCUIT AND SWITCH.
- INCANDESCENT LIGHT FIXTURE, CEILING MOUNTED
- FIXTURE, RECESSED 2'x 2' SEE PLAN FOR TYPE
- E — LIGHT FIXTURE, SEE PLAN FOR TYPE "E" FOR EMERGENCY CIRCUIT OPERATION "M" FOR MASTER BALLAST "S" FOR SATELLITE FIXTURE SURFACE, PENDANT OR RECESSED MOUNTED (TYPICAL).
- +8'-6" A 100 — REFERENCE TO ELECTRICAL MATERIAL SCHEDULES FOR MOUNTING HEIGHT SEE NOTES 3 & 7.
- WP — SINGLE RECEPTACLE, UL LABELED, 3 WIRE, 2 POLE, 20 AMP. GROUNDING TYPE. NEMA #5-20R. WP = WEATHER PROOF. EP = EXPLOSION PROOF.
- DUPLEX RECEPTACLE UL LABELED, 3 WIRE, 2 POLE, 20 AMP GROUNDING TYPE NEMA #5-20R WALL MOUNTED
- DUPLEX RECEPTACLE, UL LABELED, 3 WIRE, 2 POLE, 20 AMP. GROUNDING TYPE NEMA #5-20R. BOX INDICATES FLOOR MOUNTING, TYPICAL.
- DUAL DUPLEX, WALL-MOUNTED RECEPTACLE ISOLATED UL LABELED, 3 WIRE, 2POLE, 20AMPERE, GROUNDING TYPE NEMA 5-20R
- DUAL DUPLEX, FLOOR-MOUNTED RECEPTACLE ISOLATED UL LABELED, 3 WIRE, 2POLE, 20AMPERE, GROUNDING TYPE NEMA 5-20R
- SPECIAL PURPOSE RECEPTACLES, AS IDENTIFIED ON PLAN.
- WELDING OR OTHER SPECIAL PURPOSE RECEPTACLE AS IDENTIFIED ON PLAN.
- C — SPECIAL OUTLET: C = CLOCK. H = HUMIDISTAT. T=THERMOSTAT.
- EXIT LIGHT, WALL SURFACE MOUNTED WITH UNIVERSAL KNOCKOUT. DIRECTIONAL ARROWS (AS REQUIRED)
- EXIT LIGHT (SAME AS ABOVE, EXCEPT CEILING MOUNTED)
- A — ANNUNCIATOR. H = HORN, S = SPEAKER.
- BELL.
- 2 P — SMOKE DETECTOR, "P" DENOTES PHOTO-ELECTRIC TYPE, "2" INDICATES ZONE OF SERVICE.
- BUZZER.
- PUSH BUTTON STATION (SHOWN WITH STANCHION MOUNT).
- M — MANUAL ALARM PULL STATION
- HPL 123 — DEVICE AS IDENTIFIED ON PROCESS DIAGRAM
- NEW TELEPHONE OUTLET (WALL MOUNTED).
- DATA OUTLET (WALL MOUNTED).
- ELECTRICAL OR MECHANICAL EQUIPMENT AS IDENTIFIED ON PLAN.
- G — WARNING LIGHT, STROBE.

PLAN SYMBOLS

S — ELECTRICAL DEVICE WITH BOX OR ENCLOSURE.

CB	= CIRCUIT BREAKER.	PT	= PRESSURE TRANSMITTER.
D	= DOOR SWITCH.	RS	= ROPE SWITCH (EMERGENCY STOP).
E	= EMERGENCY LIGHT SWITCH.	S	= SWITCH AS INDICATED ON PLAN.
F	= FLAME DETECTOR.	HHL	= HIGH-HIGH LEVEL SWITCH.
FC	= FLOW RECORDER CONTROLLER.	HOA	= HAND-OFF-AUTOMATIC SWITCH.
FS	= FLOW SWITCH.	LLL	= LOW-LOW LEVEL SWITCH.
FT	= FLOW TRANSMITTER.	MOA	= MANUAL-OFF-AUTOMATIC SWITCH.
H	= HEAT DETECTOR.	ON/OFF	= ON/OFF CONTROL SWITCH
HL	= HIGH LEVEL SWITCH.	ROA	= REMOTE-OFF-AUTOMATIC.
I	= IONIZATION DETECTOR.	TBS	= TORN BELT SWITCH.
LG	= LEVEL GAGE.	ZSS	= ZERO SPEED SWITCH.
LL	= LOW LEVEL SWITCH.	SD	= SMOKE DETECTOR.
LS	= LIMIT SWITCH.	SV	= SOLENOID VALVE.
LT	= LEVEL TRANSMITTER.	SS	= START-STOP SWITCH.
MP	= MANUAL PULL FIRE ALARM STATION.	T	= TRANSFORMER.
OFC	= OIL FUSE CUTOUT.	TC	= TEMPERATURE CONTROLLER.
P	= PILOT OR INDICATING LIGHT.	TS	= TEST SWITCH.
PC	= PHOTO ELECTRIC CELL.	TT	= TEMPERATURE TRANSMITTER.
PS	= PRESSURE SWITCH.	VS	= VIBRATION SWITCH.

POLELINE AND DUCTBANK PLAN SYMBOLS

28DFC 60/H2 — EXISTING POLE WITH CONTINUING CONDUCTORS. SHOWN WITH POLE NUMBER, TYPE, HEIGHT, AND CLASS PER ANSI 05.1-1987.

DFC	= DOUGLAS FIR CREOSOTE TREATED.		
DFP	= DOUGLAS FIR PENTA TREATED.		
WRC	= WESTERN RED CEDAR UNTREATED.		
WRCC	= WRC CREOSOTE TREATED.		
SP	= SOUTHERN PINE UNTREATED.		
SPC	= SOUTHERN PINE CREOSOTE TREATED.		

P — CIRCUIT IDENTIFICATION.

C	= CONTROL.	S	= SECONDARY.
F	= FIRE ALARM.	T	= TELEPHONE.
I	= INSTRUMENTATION.	SD	= SERVICE DROP.
P	= PRIMARY.		

- EXISTING POLE WITH SIDEWALK GUY.
- NEW POLE, WITH ANCHOR.
- HEAD GUY BETWEEN NEW POLES.
- EXISTING DISTRIBUTION TYPE TRANSFORMER.
- PAD MOUNTED TRANSFORMER.
- NEW DISTRIBUTION TYPE TRANSFORMER.
- SERVICE WEATHERHEAD.
- TXX — EXISTING STEEL TOWER. IDENTIFY WITH SEQUENTIAL NUMBER (TYPICAL).
- TXX — NEW STEEL TOWER. IDENTIFY WITH SEQUENTIAL NUMBER (TYPICAL).
- EAC2 — ACCESS CHAMBER (AC) WITH SEQUENTIAL NUMBER. E = ELECTRICAL. C = COMMUNICATIONS. H = HANDHOLE. S =SECURITY SYSTEMS. T =TELEPHONE. V =VAULT.
- UA — OVERHEAD CONDUCTOR WITH SWITCH. SS = TOP ARM SECTIONALIZING SWITCH. PTD = POLE TOP DISCONNECT SWITCH. OFC = OIL FUSE CUTOUT. PFC = PORCELAIN FUSED CUTOUT. UA = UNDER ARM SWITCH. N.C. = NORMALLY CLOSED. N.O. = NORMALLY OPEN.
- POLE WITH CONDUCTOR DEADENDS AND JUMPER.
- G — OVERHEAD CONDUCTOR WITH POLE MOUNTED SECTIONALIZER. G = SF6 GAS. V = VACUUM.
- 3# 2/0 ACSR — OVERHEAD CONDUCTOR; QUANTITY, SIZE, AND TYPE IDENTIFICATION. AAC = ALL ALUMINUM CONDUCTOR , IDENTIFIED WITH FLOWER NAME. AAAC = ALL ALUMINUM ALLOY CONDUCTOR, IDENTIFIED WITH CITY NAME. ACSR = ALUMINUM CABLE STEEL REINFORCED, IDENTIFIED WITH BIRD NAME. AN = ANNEALED. HD = HARD DRAWN. MHD = MEDIUM HARD DRAWN. CU = COPPER, SOFT OR ANNEALED, UON. WP = WEATHERPROOF.
- OVERHEAD CONDUCTOR WITH POLE MOUNTED STREET LIGHT. I = INCANDESCENT. HPS = HIGH PRESSURE SODIUM. MH = METAL HALIDE.
- OVERHEAD CONDUCTOR WITH POLE MOUNTED FLOODLIGHT.
- 6E — OVERHEAD CONDUCTOR WITH FUSED SWITCH. SHOWN WITH 6E FUSE.

NOTES:

1. APPROPRIATE BOX AND COVER SHALL BE PROVIDED WITH ALL OUTLETS, SEE SPECIFICATIONS.
2. NOT USED.
3. MOUNTING HEIGHT OF EQUIPMENT, UNLESS OTHERWISE NOTED, SHALL BE ABOVE FINISHED FLOOR AS FOLLOWS:
   - A. LIGHTS OVER DOORS, 1'-0" ABOVE DOOR OPENING TO BOTTOM OF FIXTURE.
   - B. LOCAL SWITCHES, 4'-0" TO CENTERLINE.
   - C. OFFICE AND CONTROL ROOM RECEPTACLES 1'-6" TO CENTERLINE.
   - D. OTHER RECEPTACLES, 3'-6" TO CENTERLINE.
   - E. LIGHTING PANELS, 6'-6" MAXIMUM TO TOP CIRCUIT BREAKER.
4. EMERGENCY LIGHTING SYSTEM BRANCH CIRCUIT RACEWAY AS WELL AS FIRE ALARM AND DETECTION RACEWAY SHALL BE INDEPENDENT OF OTHER RACEWAY SYSTEMS.
5. MINIMUM CONDUCTOR SIZE FOR ALL LIGHTING AND 120V CONVENIENCE RECEPTACLE CIRCUITS SHALL BE AWG #12, 600V, TYPE THW INSULATION STRANDED COPPER WIRE, UNLESS OTHERWISE NOTED. CONNECTIONS SHALL BE MADE WITH CRIMP LUGS AND CRIMP CONNECTORS. WIRE NUTS SHALL NOT BE USED.
6. FLEXIBLE CONDUIT SHALL BE USED FOR RECESSED FIXTURES FROM THE JUNCTION BOX TO THE FIXTURE NOT EXCEEDING A MAXIMUM LENGTH OF 6'-0". MINIMUM LENGTH FOR FLEXIBILITY SHALL BE 3'-0".
7. MOUNTING HEIGHT OF LIGHTING FIXTURES, AS INDICATED ON THE DRAWINGS, IS FROM FINISHED FLOOR, PLATFORM, OR DECK TO BOTTOM OF FIXTURE.
8. MINIMUM DISTANCE BETWEEN THE TOP OF CABLE TRAY AND BOTTOM OF THE STRUCTURAL STEEL DIRECTLY ABOVE IT SHALL BE 6". WHERE TWO TRAYS CROSS EACH OTHER, THE TOP OF THE LOWER TRAY TO THE BOTTOM OF THE TRAY ABOVE SHALL BE 6" MINIMUM.
9. THE CONSTRUCTOR SHALL PROVIDE CONDUIT BODIES, FITTINGS, AND SUPPORTS NOT SHOWN ON THE DRAWINGS BUT REQUIRED BY JOB CONFIGURATION OR THE NEC.
10. GROUND UNDERGROUND PIPING TO MAIN GROUNDING COUNTERPOISE.

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REFERENCES

DRAWING NO.	DESCRIPTION
WA-E-001	ABBREVIATIONS & ACRONYMS
WA-E-003	SCHEMATIC & WIRING DIAGRAM SYMBOLS
WA-E-004	ONE & THREE LINE DIAGRAM SYMBOLS

REVISIONS

NO.	DATE	BY	CHKD	ENGR	PROJ	DESCRIPTION
1	6-15-98	J.G.				ISSUED FOR AS-BUILT

0 ISSUED FOR CONSTRUCTION

DRAWN	M.M.	6-25-96
CHECKED	J.K.	7-3-96
ENGINEER	K.R.	7-3-96
PROJ	M.D.W.	7-8-96

AS-BUILT DRAWINGS

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100 WEST WALNUT STREET
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CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY
SITE NO. 1 - HANFORD, WASHINGTON

TITLE: ELECTRICAL STANDARD PLAN SYMBOLS

SCALE	CONTRACT NUMBER	PROJECT NUMBER
NONE	PP150969	8094

SHEET NUMBER: WA-E-002 REVISIONS: 1