REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

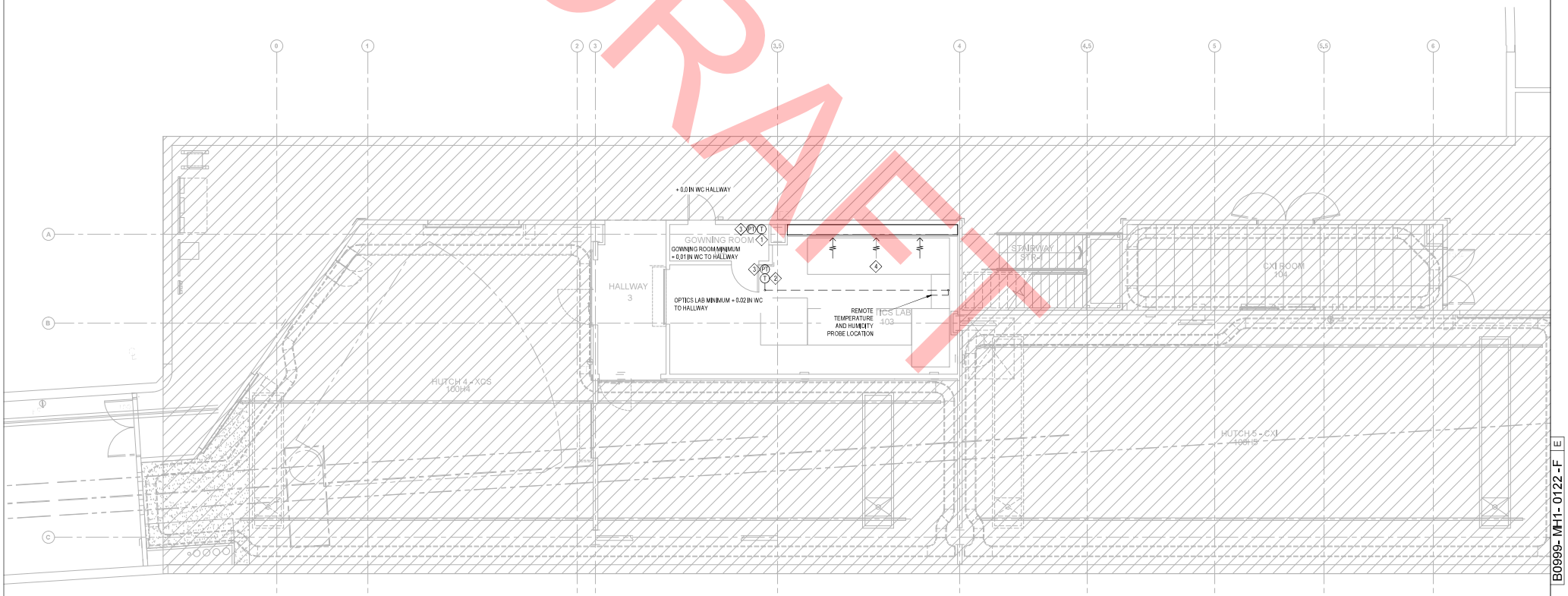
PLAN GENERAL NOTES

1 NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
2 CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.

MECHANICAL SHEET NOTES

1. PROVIDE NEW VAISALA XMW85 THERMOSTAT AND HUMIDITY SENSOR. MOUNT AT 48" AFF TO BOTTOM OF THERMOSAT. RECONNECT TO EXISTING REHEAT COIL AND EXISTING BUILDING ALC. SEE E3.01 FOR RACEWAYS AND INTERCONNECTION. SEE 1/E3.02 FOR PROTOCOL CONVERTER. 1
2. PROVIDE NEW VAISALA INDIGO520 THERMOSTAT. MOUNT AT 48" AFF TO BOTTOM OF THERMOSAT. COMPLETE WITH 32.80 FT TEMPERATURE AND RELATIVE HUMIDITY PROBE. CONTRACTOR TO OFFSET PROBE UP THROUGH CEILING, ACROSS THE ROOM, BACK DOWN TO FLOOR LEVEL, AND NEXT TO THE EDGE OF LASER TABLE LEG. RECONNECT TO EXISTING REHEAT COIL AND EXISTING BUILDING ALC. SEE E3.01 FOR RACEWAYS AND INTERCONNECTION.
3. PROVIDE NEW SENTRA MRC PRESSURE TRANSDUCER. MOUNT AT 66" AFF TO BOTTOM OF PRESSURE TRANSDUCER WITHIN THE OPTICS LAB. MOUNT AT 48" AFF TO BOTTOM OF PRESSURE TRANSDUCER AT GOWNING ROOM. CONTRACTOR TO EXTEND ONE PROBE TO THE HALLWAY. COORDINATE WITH ARCHITECT AND FIELD VERIFY FOR EXACT ROUTING. CONNECT TO EXISTING BUILDING ALC. COORDINATE WITH SLAC FOR MORE INFORMATION. SEE E3.01 FOR RACEWAYS AND INTERCONNECTION.
4. NEW 24" HIGH OPENING AT LOW WALL FOR RETURN AIR. SEE A2.01B AND 5/A9.01B FOR MORE DETAIL. SLAC TO PROVIDE CLEARANCE UNDER THE TABLES TO AVOID ANY OBSTRUCTIONS TO LOW WALL RETURN OPENINGS. 1

DRAFT



1 M2.01 **HVAC FLOOR PLAN**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit plan comps
Construction Authorization (CA)
BY: mm
DATE: 10/1/2026 FROM: 04-16
Revised Authorization ☒ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER
M 19582
EXP. 9/30/27
MECHANICAL

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | M2.01

SLAC NATIONAL ACCELERATOR LABORATORY | U.S. DEPARTMENT OF ENERGY

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ENGR CHEN, HSIN-CHIEH 04-14-2026
DES TSAI, WEI-MU 04-14-2026
CHKR LI, MAY 04-14-2026
APPROVALS DEROSSETT, HANNAH 04-14-2026

B999
OPTICS LAB DESIGN
MECHANICAL
HVAC FLOOR PLAN

DRAWING NUMBER B0999-MH1-0122 | REVISION F | E

B0999-MH1-0122 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

PLAN GENERAL NOTES

1. EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2. NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3. CONTRACTOR SHALL PROVIDE DUCT MATERIAL SUBMITTALS TO OWNER AND TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL, PRIOR TO PURCHASING AND INSTALLATION.
4. COORDINATE LOCATION OF EXISTING DUCTWORK AND NEW DUCTWORK WITH OTHER TRADES.
5. ANY NEW OR EXISTING DUCTWORK OFFSETS REQUIRED AS A RESULT OF EXISTING JOB CONDITIONS OR LACK OF COORDINATION WITH OTHER TRADES, SHALL BE PROVIDED AT NO ADDITIONAL COST TO OWNER AND SUBJECT TO OWNER'S REVIEW.
6. CONTRACTOR SHALL PROVIDE DUCTWORK AND TRANSITIONS EQUAL TO FREE AREA OF DUCTWORK AS SHOWN ON DRAWING, TO PREVENT A CONFLICT WITH EXISTING CONDITIONS.
7. ALL DUCTWORK SHALL BE SUPPORTED ACCORDING TO SMACNA AND SEISMICALLY BRACED PER SMACNA'S SEISMIC RESTRAINT MANUAL TO MEET BUILDING CODE.
8. TAB CONTRACTOR SHALL BALANCE ALL EQUIPMENT SHOWN ON THIS DOCUMENT PER THE FLOW QUANTITIES.
9. CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.

MECHANICAL SHEET NOTES

1. PROVIDE NEW FAN FILTER UNIT. COMPLETE WITH ULPA FILTER AND MERV FILTER. FAN FILTER UNIT WILL BE CONTINUOUSLY RUNNING. INTERLOCK FAN FILTER UNIT TO EXISTING ALC SYSTEM. FAN FILTER UNIT SHALL ALARM AT FAULT. SEE E2.01 FOR MORE INFORMATION.
2. PROVIDE NEW 24X24 CEILING RETURN GRILLE WITH FLEXIBLE DUCT CONNECTION.
3. NEW BACNET MS/TP TO IP ROUTER. SEE 2/E2.01 FOR MORE INFORMATION.

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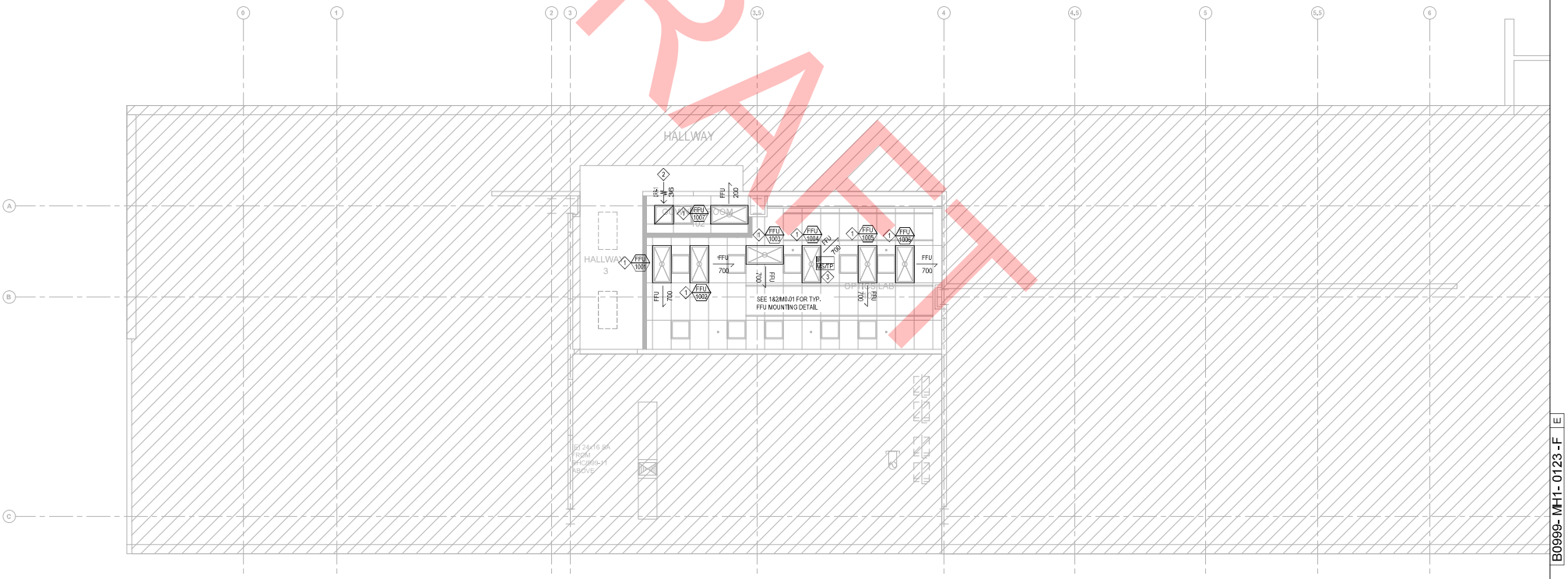

1 M2.02 **HVAC RCP**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit/plan comps
Construction Authorization (dFD)
BR number
DATE: 10/1/2026 FROM: Dan Ho
Revised Authorization ☒ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER
M 19582
EXP. 9/30/27
MECHANICAL

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | M2.02

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ENGR	DES	CHKR	DATE
CHEN, HSIN-CHIEH	TSAI, KEVIN	LI, MAY	05/4/2026 05/4/2026 05/4/2026

APPROVALS: DERGOSETT, HANNAH — DATE: 05/4/2026

B999
OPTICS LAB DESIGN
MECHANICAL
HVAC RCP

DRAWING NUMBER: B0999-MH1-0123 | REVISION: F | E

B0999-MH1-0123-F | E

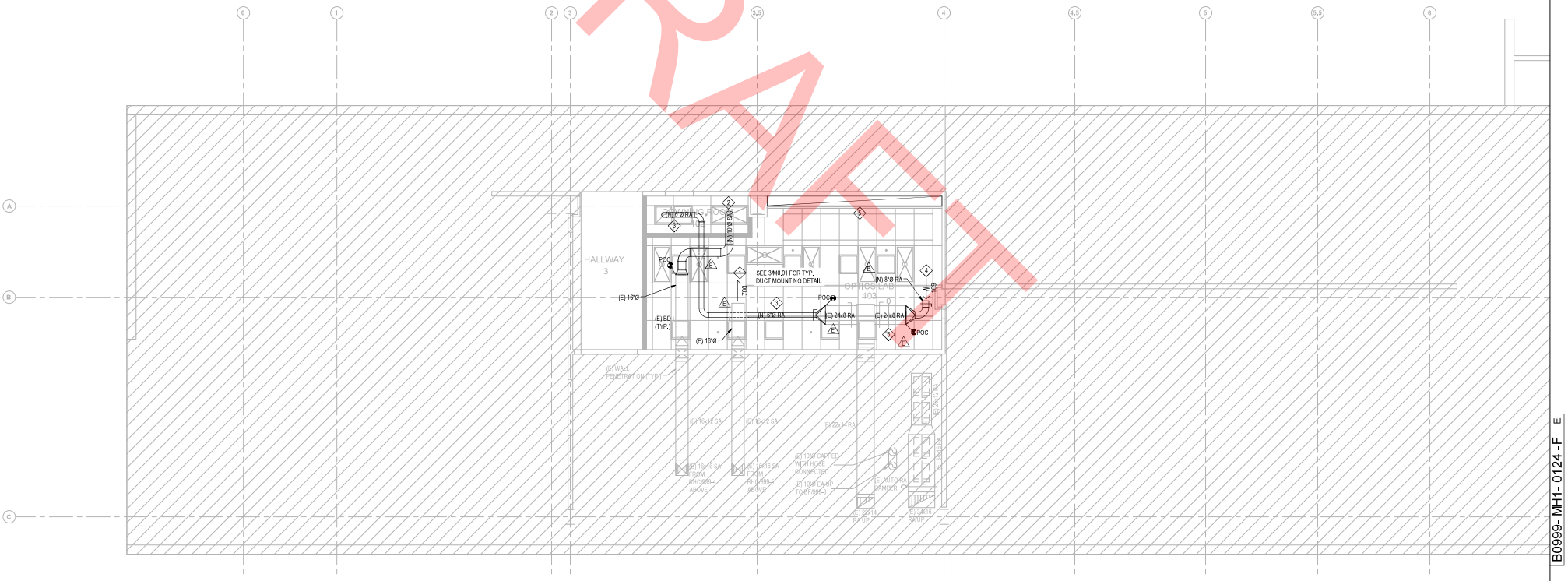
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

PLAN GENERAL NOTES

1 EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2 NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3 CONTRACTOR SHALL PROVIDE DUCT MATERIAL SUBMITTALS TO OWNER AND TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL, PRIOR TO PURCHASING AND INSTALLATION.
4 COORDINATE LOCATION OF EXISTING DUCTWORK AND NEW DUCTWORK WITH OTHER TRADES.
5 ANY NEW OR EXISTING DUCTWORK OFFSETS REQUIRED AS A RESULT OF EXISTING JOB CONDITIONS OR LACK OF COORDINATION WITH OTHER TRADES, SHALL BE PROVIDED AT NO ADDITIONAL COST TO OWNER AND SUBJECT TO OWNER'S REVIEW.
6 CONTRACTOR SHALL PROVIDE DUCTWORK AND TRANSITIONS EQUAL TO FREE AREA OF DUCTWORK AS SHOWN ON DRAWING, TO PREVENT A CONFLICT WITH EXISTING CONDITIONS.
7 ALL DUCTWORK SHALL BE SUPPORTED ACCORDING TO SMACNA AND SEISMICALLY BRACED PER SMACNA'S SEISMIC RESTRAINT MANUAL TO MEET BUILDING CODE.
8 TAB CONTRACTOR SHALL BALANCE ALL EQUIPMENT SHOWN ON THIS DOCUMENT PER THE FLOW QUANTITIES.
E 9 CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.
10 MAINTAIN A MINIMUM HEAD CLEARANCE OF 84" AFF UNDER SUSPENDED DUCTWORK.

MECHANICAL SHEET NOTES

1 EXISTING 16"Ø SUPPLY AIR DUCT OPENING FROM RHC-999-5 TO DISCHARGE INTO CEILING PLENUM SPACE. ADJUST EXISTING MANUAL VOLUME DAMPER TO 700 CFM.
2 PROVIDE NEW 10"Ø SUPPLY AIR DUCT CONNECTING EXISTING 16"Ø TO NEW FAN FILTER UNIT INLET. PROVIDE FLEXIBLE DUCT AT FAN FILTER UNIT INLET. ADJUST EXISTING MANUAL VOLUME DAMPER TO 200 CFM.
3 PROVIDE NEW 6"Ø RETURN AIR DUCT WITH NEW MANUAL VOLUME DAMPER AND CONNECT BACK TO EXISTING.
4 PROVIDE NEW 8"Ø RETURN AIR DUCT WITH NEW MANUAL VOLUME DAMPER AND CONNECT BACK TO EXISTING.
E 5 NEW FURRED OUT WALL FOR RETURN AIR PATHWAY TO CEILING PLENUM. SEE ARCHITECT DRAWINGS.
6 EXISTING AUTO RETURN AIR DAMPER. SLAC TO MODIFY OPERATION TO NEW DESIGN CRITERIA.



1 M2.03 **HVAC CEILING PLAN**
SCALE: 1/4" = 1'-0"

DRAFT

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplies permission copy
Construction Authorization (PC)
BIO: 0000
DATE: 10/1/2026 FROM: 2/4/16
Revised Authorization: ☒ No ☐ Yes
This plan is a construction authorization copy of the original BIO approved job set of plans and specifications. Any other changes, revisions, or other requirements shall be submitted to and approved by the BIO office prior to the changes being made in the field.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH. (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
M19582
EXP. 9/30/27
MECHANICAL

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04		M2.03

SLAC NATIONAL ACCELERATOR LABORATORY — U.S. DEPARTMENT OF ENERGY

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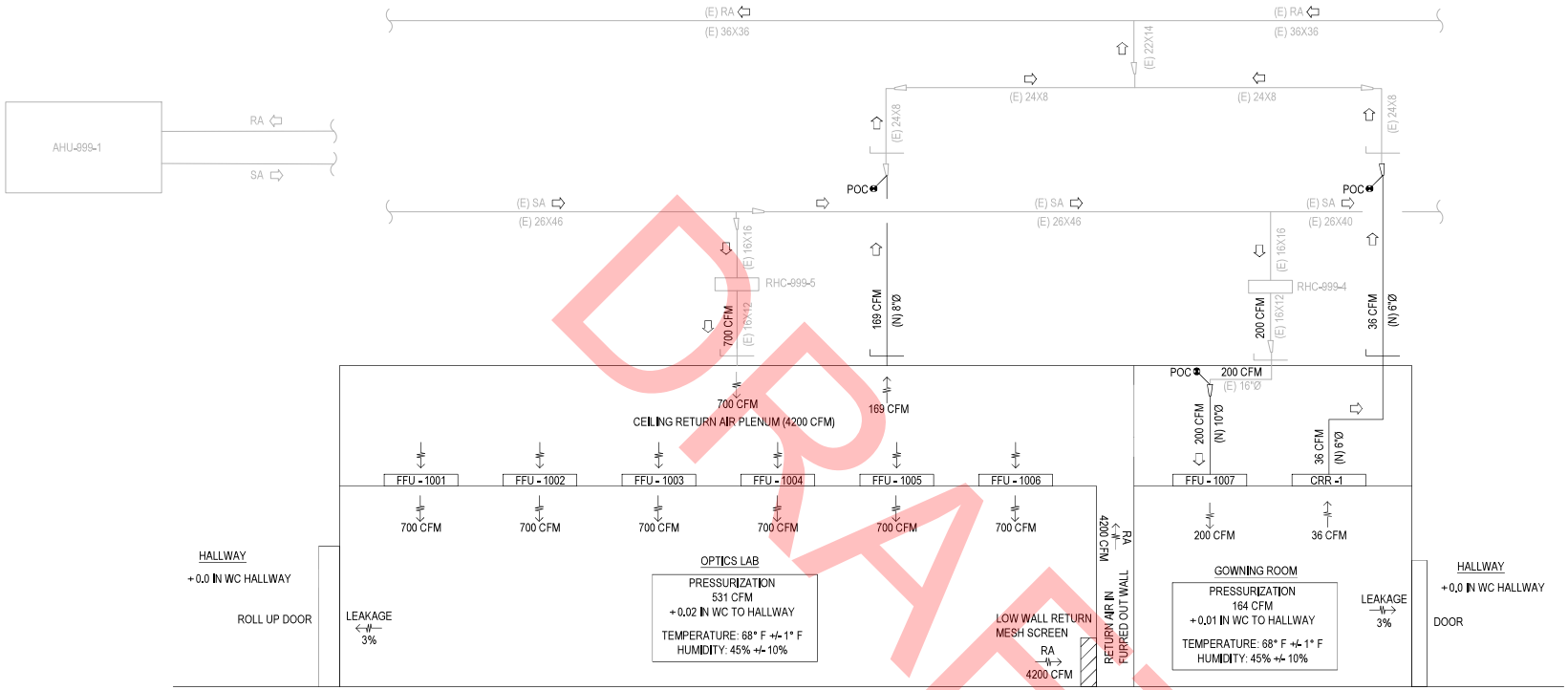
B999
OPTICS LAB DESIGN
MECHANICAL
HVAC CEILING PLAN

ENGR: CHEN, HENG-HSIU	DATE: 05-14-2026	APPROVALS	DATE
DES: SHAH, MOHIN	05-14-2026	DEROSSETT, HANNAH	05-14-2026
CHKR: JL, MAY	05-14-2026		

DRAWING NUMBER: B0999-MH1-0124 | REVISION: F | E

B0999- MH1- 0124 -F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026



OPTICS LAB PRESSURIZATION REQUIRED CFM	
DIFFERENTIAL PRESSURE (DP)	+0.02 IN WC
ROLL UP DOOR AREA (6'X8'X0.03") *3% LEAKAGE RATE ASUMMPTION	1.44 FT^2
Q = 2610 X A X SQRT (DP)* *ASHRAE PRESSURIZATION CALCULATION INCLUDING LEAKAGE RATE	531 CFM
SUPPLY AIR FROM RHC-999-5 AND AHU	700 CFM
RETURN AIR TO AHU	169 CFM
NET POSITIVE CFM FOR +0.02 IN WC	531 CFM

GOWNING ROOM PRESSURIZATION REQUIRED CFM	
DIFFERENTIAL PRESSURE (DP)	+0.01 IN WC
SWING DOOR AREA (3'X7'X0.03") *3% LEAKAGE RATE ASUMMPTION	0.63 FT^2
Q = 2610 X A X SQRT (DP)* *ASHRAE PRESSURIZATION CALCULATION INCLUDING LEAKAGE RATE	164 CFM
SUPPLY AIR FROM RHC-999-4 AND AHU	200 CFM
RETURN AIR TO AHU	36 CFM
NET POSITIVE CFM FOR +0.01 IN WC	164 CFM

DRAFT

1 M3.00 **B999 OPTICS LAB/GOWNING ROOM AIR FLOW DIAGRAM**
SCALE: NTS

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit/plan comps
Construction Authorization (dft)
BR: mm/dd/yy
DATE: 10/1/2025 FROM: DH-16
Revised Authorization: No Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

M 19582
EXP. 9/30/27

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04	M3.00

SLAC U.S. DEPARTMENT OF ENERGY
NATIONAL ACCELERATOR LABORATORY

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ENGR: CHEN, HSIN-CHIEH	DATE: 05-18-2026	APPROVALS	DATE
DES: TS-IN, KEVIN	DATE: 05-18-2026	DERISSETTI, HANNAH	05-19-2026
CHKR: LI, MARY	DATE: 05-18-2026		

B999
OPTICS LAB DESIGN
MECHANICAL
AIRFLOW DIAGRAM

DRAWING NUMBER: B0999-MH6-0125 | REVISION: F | E

B0999-MH6-0125-F | E

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE 2022 CALIFORNIA MECHANICAL AND PLUMBING CODE.
2. THE SUBMITTAL OF A BID PROPOSAL SHALL BE CONSIDERED CONCLUSIVE EVIDENCE THAT THE CONTRACTOR IS THOROUGHLY FAMILIAR WITH THE INTENT OF THE CONTRACT DOCUMENTS, THE CONTRACTOR, PRIOR TO BIDDING, SHALL CHECK EXISTING INSTALLATIONS AND SYSTEMS RELATED TO HIS WORK AND SHALL IN THE BID PROPOSAL INCLUDE ALL LABOR AND MATERIAL REQUIRED FOR COMPLETION OF THE SYSTEM.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING VISITED THE SITE AND SATISFIED HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK WILL BE PERFORMED, THE CONTRACTOR SHALL CHECK ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK, NO ALLOWANCE WILL BE MADE FOR ANY EXTRA EXPENSE WHICH MAY BE INCURRED DUE TO NEGLECT OR FAILURE TO EXAMINE THE SITE, EXISTING CONDITIONS, UTILITIES, ETC. THE SITE VISIT SHALL BE DURING THE BID WALK AND/OR PREARRANGED WITH THE OWNER.
4. CONTRACTOR SHALL PROVIDE QUALIFIED TRADE PROFESSIONALS WITH ADEQUATE SAFETY TRAINING IN CONSTRUCTION OF THESE TYPES OF FACILITIES. LACK OF SAFETY PRACTICE SHALL DISQUALIFY CONTRACTOR AT OWNER DISCRETION.
5. CONTRACTOR SHALL SCHEDULE AND COORDINATE THE FOLLOWING WITH OWNER OR OWNER'S PROJECT MANAGER.
   - A. ANY AND ALL UTILITIES SHUT DOWN. CONTRACTOR SHALL GIVE A MINIMUM OF TWO WEEKS PRIOR NOTICE FOR EACH SHUT DOWN.
   - B. ANY AND ALL WORK BEING PERFORMED IN AREAS WHERE THE FACILITY WILL REMAIN IN OPERATION.
   - C. ANY WORK WITHIN THE PARAMETER OF ITEMS A AND B ABOVE SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR.
6. ALL MATERIALS AND WORKMANSHIP ARE SUBJECT TO APPROVAL BY OWNER. ANY DEFECTIVE PORTION OF THE WORK SHALL BE REPLACED BY THE CONTRACTOR AS PART OF THIS CONTRACT AT NO ADDITIONAL COST TO THE OWNER.
7. ABSOLUTE ACCURACY OF DRAWINGS CANNOT BE GUARANTEED, WHILE EVERY EFFORT HAS BEEN MADE TO COORDINATE THE LOCATION OF THE EXISTING EQUIPMENT, PIPING ETC, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE EXACT REQUIREMENTS GOVERNED BY ACTUAL JOB CONDITIONS.
8. IN THE AREA OF NEW CONSTRUCTION WILL BE FOUND A NUMBER OF EXISTING SERVICES, CONTRACTOR SHALL PROTECT AND MAINTAIN ALL ACTIVE LINES IN GOOD OPERATING CONDITION.
9. PROTECT EXISTING BUILDING STRUCTURES AND ADJACENT FINISHED SURFACES DURING CONSTRUCTION. PATCH, REPAIR AND REFINISH EXISTING WORK DAMAGED BY WORK UNDER THIS DIVISION TO MATCH ADJACENT UNDISTURBED AREAS. PATCHING, REPAIRING AND REFINISHING SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADES INVOLVED.
10. ALL MECHANICS INVOLVED IN PIPE DEMOLITION SHALL WEAR PROPER PERSONAL PROTECTIVE GEAR AND SHALL MAKE THE NECESSARY PROVISIONS TO PREVENT EXPOSURE TO HAZARDOUS MATERIALS.
11. WELDING OR OPEN FLAME ARE NOT PERMITTED DURING THE DEMOLITION PROCESS OF ANY FLAMMABLE OR COMBUSTIBLE PIPING OR EXHAUST DUCT SYSTEMS.
12. A DAILY WELDING PERMIT / HOT WORK SHALL BE OBTAINED FROM OWNER PRIOR TO COMMENCING ANY WELDING ACTIVITY.
13. CONTRACTOR SHALL COORDINATE FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND OWNER OR OWNER'S REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.
14. EH&S REPRESENTATIVE SHALL BE PRESENT WHEN CONTRACTOR CUTS INTO PIPING.
15. ANY PIPE FLUSHING OR DRAINING AS PART OF THE DEMOLITION AND INSTALLATION MUST BE COORDINATED WITH THE WATER PROGRAMS MANAGER. A

SAFETY NOTES

1. OPERATION OF ENERGY ISOLATING DEVICES SHALL BE PERFORMED BY SLAC WORKERS. CONTACT THE FIELD CONSTRUCTION MANAGER FOR ASSISTANCE WITH EQUIPMENT OPERATION.
2. SYSTEMS POTENTIALLY CONTAINING HAZARDOUS ENERGY SHALL BE LOCKED OUT IN ACCORDANCE WITH SLAC ESH MANUAL CHAPTER 51.

MECHANICAL PIPING SCOPE SUMMARY

1. PROVIDE NEW 1-1/2" CHILLED WATER PIPING SUPPLY AND RETURN PIPING FROM EXISTING TO NEW OPTICS LAB, PROVIDE NEW SUPPLY AND RETURN DROPS WITHIN THE OPTICS LAB FOR FUTURE CONNECTION.
2. PROVIDE NEW 3" PROCESS COOLING WATER SUPPLY AND RETURN PIPING FROM EXISTING TO NEW OPTICS LAB, PROVIDE NEW SUPPLY AND RETURN DROPS WITHIN THE OPTICS LAB FOR FUTURE CONNECTION.
3. PROVIDE NEW WIRED PUCK WATER LEAK DETECTION SYSTEM AND CONNECT TO EXISTING ALC.
4. PROVIDE NEW 1/2" COMPRESSED AIR AND 1/4"Ø NITROGEN, ARGON, KRYPTON, AND NEON SHUT-OFF VALVES IN THE OPTICS LAB.

ABBREVIATIONS

ABBREV	DESCRIPTION
AR	ARGON GAS
BTUH	BRITISH THERMAL UNIT PER HOUR
CA	COMPRESSED AIR
CBC	CALIFORNIA BUILDING CODE
CC	COOLING COIL
CD	CONDENSATE DRAIN
CFC	CALIFORNIA FIRE CODE
CFF	CAP FOR FUTURE
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CMC	CALIFORNIA MECHANICAL CODE
CO	CLEANOUT
CONN	CONNECTION
CPC	CALIFORNIA PLUMBING CODE
CTE	CONNECT TO EXISTING
(D)	DEMO
DN	DOWN
DP	DIFFERENTIAL PRESSURE
DWG	DRAWING
EA	EACH
EFF	EFFICIENCY
ES	END SWITCH
ESP	EXTERNAL STATIC PRESSURE
(E)	EXISTING
(F)	FUTURE
FC	FLEXIBLE CONNECTION
FF	FINISH FLOOR OR FINAL FILTER
FLA	FULL LOAD AMPS
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FNPT	FEMALE NATIONAL PIPE THREAD
FV	FACE VELOCITY
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GI	GALVANIZED IRON
GPM	GALLONS PER MINUTE
GSM	GALVANIZED SHEET METAL
HP	HORSEPOWER
HV	HOUSE VACUUM
KR	KRYPTON GAS
IWG	INCHES WATER GAUGE
KW, KWH	KILOWATT, KILOWATT HOUR
L.F.	LINEAR FEET
MAX	MAXIMUM
MBH	THOUSAND BTU'S PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MOD	MODEL
MECH	MECHANICAL
MFC	MANUFACTURER
MIN	MINIMUM
MNPT	MALE NATIONAL PIPE THREAD
MS	MOTOR STARTER
MVD	MANUAL VOLUMETRIC DAMPER
(N)	NEW
N2	NITROGEN GAS
NC	NORMALLY CLOSED
NE	NEON GAS
NG	NATURAL GAS
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
P	PUMP
PCWR	PROCESSED COOLING WATER RETURN
PCWS	PROCESSED COOLING WATER SUPPLY
POC	POINT OF CONNECTION
(R)	RELOCATED
RA	RETURN AIR
REQ	REQUIRED
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
SA	SUPPLY AIR
SCH	SCHEDULE
SM	SHEET METAL
SP	STATIC PRESSURE
SPECS	SPECIFICATIONS
SS	STAINLESS STEEL
SWR	SIDEWALL REGISTER
TDH	TOTAL DYNAMIC HEAD
TH	TOTAL HEAD
TSP	TOTAL STATIC PRESSURE
T	THERMOSTAT
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VEL	VELOCITY
VERT	VERTICAL
VI	VIBRATION ISOLATOR
W/	WITH
W/O	WITHOUT
WC	WATER COLUMN

PIPE MATERIAL SCHEDULE

CODE	ITEM	MATERIAL DESCRIPTION AND JOINING METHOD
CA	COMPRESSED AIR	PIPE CLASS C1, TYPE L WITH 95-5 TIN ANTIMONY SOLDER (COPPER)
CHWS CHWR	ABOVE GROUND CHILLED WATER PIPING	PIPE CLASS C1, TYPE L WITH 95-5 TIN ANTIMONY SOLDER (COPPER)
N2 & OTHERS	NITROGEN, ARGON, NEON, KRYPTON GAS	STAINLESS STEEL PIPE TYPE 316, COMPRESSION FITTINGS
PCWS PCWR	ABOVE GROUND PROCESS COOLING WATER PIPING	4" AND LARGER: STAINLESS STEEL TYPE 304, GROOVED COUPLINGS SMALLER THAN 4": PIPE CLASS C1, TYPE L WITH 95-5 TIN ANTIMONY SOLDER (COPPER) OR BRAZED.

PIPE INSULATION THICKNESS TABLE PER CALIFORNIA TITLE 24 TABLE 120.3

CODE	CONDUCTIVITY (IN*BTU*IN/HR*FT^2*F)	FLUID OPERATING TEMP. RANGE (°F)	MEAN RATING TEMP. (°F)	NOM. PIPE DIAMETER	MIN. PIPE INSULATION REQUIRED (THICKNESS IN INCHES)
CHWS/R	0.21-0.27	40-60	75	1.5" TO < 4"	0.5

All changes from the BID approved job set of plans and specifications shall be submitted to and approved by the BID office prior to the changes being made in the field.

REFERENCE SYMBOLS

SYMBOL	DESCRIPTION
	DETAIL# / SHEET #
	SECTION# / SHEET #
	EQUIPMENT TAG # SCHEDULE
	REVISION #
	KEYED NOTE #
	POINT OF CONNECTION TO EXISTING (POC)
	ELEVATION DATUM
	EXISTING TO BE REMOVED (DEMOLISHED)
	EXISTING TO REMAIN
	NEW
PT	PRESSURE TRANSDUCER
T	THERMOSTAT

MECHANICAL PIPING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
	C.V.	CHECK VALVE
	AV	AIR VENT, 3/8" COCK W/DISCHARGE TO DRAIN
MV	MAV	MOTORIZED ACTUATED VALVE
		CONCENTRIC REDUCER
		PIPE CAP
		PIPE BREAK
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		FLOW DIRECTION ARROW
SOV	SOV	SHUT OFF VALVE

VALVE SCHEDULE

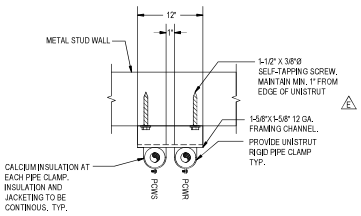
ITEM (SEE PLAN & P&ID FOR VALVE LABELING)	MATERIAL DESCRIPTION
HV-999-132	1/2" APOLLO 7014XP10 BRONZE 2 PIECE BALL VALVE WITH STAINLESS STEEL BALL & STEM, SS LEVER & NUT
HV-999-133, 134, 135, 136	1/4" APOLLO 76F10X244444A 2 PIECE FULL PORT STAINLESS STEEL BALL VALVE WITH GRAPHITE PACKING, PTFE BODY SEAL, RPTFE BEARING, SEAL WELDED
BBV-999-130, 131	1-1/2" MILWAUKEE VALVE BUTTERBALL BB-SC100 BRONZE THREADED HAND WHEEL BUTTERFLY VALVE
HV-999-102, 103, 106, 107, 114, 115, 118, 119	1-1/2" & 2" APOLLO 7014XP10 BRONZE 2 PIECE BALL VALVE WITH STAINLESS STEEL BALL & STEM, SS LEVER & NUT
CBV-999-123	1-1/2" BELL & GOSSETT 117104LF CIRCUIT SETTER
SV-999-110, 111	I&C CONTRACTOR TO SUBMIT RECOMMENDED 1-1/2" MOTORIZED ACTUATOR VALVE
BBV-999-124,125, 126, 127, 128, 129	2" MILWAUKEE VALVE BUTTERBALL BB-SC100 BRONZE THREADED HAND WHEEL BUTTERFLY VALVE
HV-999-100, 101, 104, 105, 112, 113, 116, 117	3" APOLLO 7014XP10 BRONZE 2 PIECE BALL VALVE WITH STAINLESS STEEL BALL & STEM, SS LEVER & NUT
CBV-999-120, 121, 122	2" BELL & GOSSETT 117104LF CIRCUIT SETTER
SV-999-108,109	I&C CONTRACTOR TO SUBMIT RECOMMENDED 3" MOTORIZED ACTUATOR VALVE

PIPING SYSTEMS PRESSURE TEST TABLE

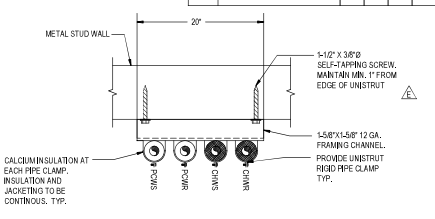
SYSTEM	TEST PRESSURE	DURATION	TEST MEDIUM
COMPRESSED AIR: (PRESSURIZED)	110% THE MAXIMUM SYSTEM DESIGN PRESSURE PER CHAPTER 14 SECTION 2.4 SLAC ESH TEST PRESSURE	FIRST LEAK CHECK PERFORMED 0.5 TIMES DESIGN PRESSURE AND 25 PSIG RAISE PRESSURE GRADUALLY IN STEPS, 30 MINUTES MINIMUM AT TEST PRESSURE PRESSURE SHALL BE REDUCED TO DESIGN PRESSURE BEFORE EXAMINING FOR LEAKS	AIR
CHILLED WATER: (PRESSURIZED)	150% THE MAXIMUM SYSTEM DESIGN PRESSURE BUT NOT LESS THAN 100 PSI, PER CHAPTER 14 SECTION 2.4 SLAC ESH TEST PRESSURE	30 MIN	WATER
NITROGEN, ARGON, NEON, KRYPTON GAS: (PRESSURIZED)	110% to 133% TIMES DESIGN PRESSURE PER CHAPTER 14 SECTION 2.4 SLAC ESH TEST PRESSURE	FIRST LEAK CHECK PERFORMED 0.5 TIMES DESIGN PRESSURE AND 25 PSIG RAISE PRESSURE GRADUALLY IN STEP 30 MINUTES MINIMUM AT TEST PRESSURE PRESSURE SHALL BE REDUCED TO DESIGN PRESSURE BEFORE EXAMINING FOR LEAKS	NITROGEN
PROCESSED COOLING WATER: (PRESSURIZED)	150% THE MAXIMUM SYSTEM DESIGN PRESSURE BUT NOT LESS THAN 100 PSI, PER CHAPTER 14 SECTION 2.4 SLAC ESH TEST PRESSURE	30 MIN	WATER

NOTE:
THIS PRESSURE TESTING TABLE IS GENERALIZED FOR PIPING SYSTEMS.

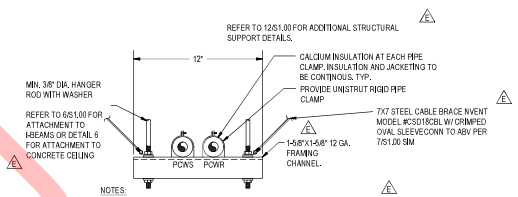
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026



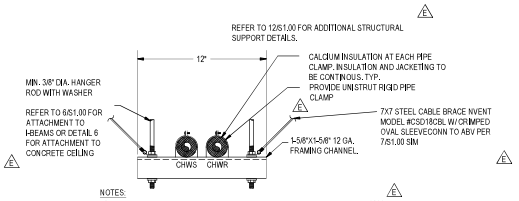
1 **PROCESS COOLING AND CHILLED WATER WALL SUPPORT**
SCALE: NTS



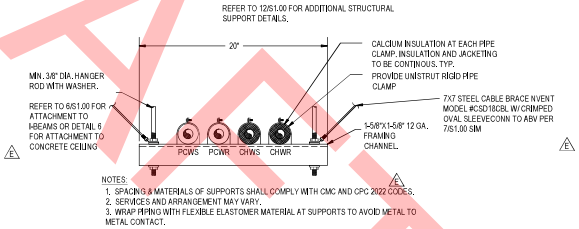
2 **PROCESS COOLING WATER WALL SUPPORT**
SCALE: NTS



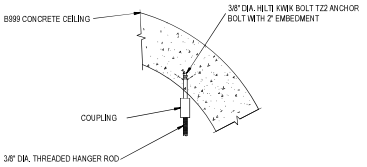
3 **PROCESS COOLING WATER HORIZONTAL SUPPORT**
SCALE: NTS



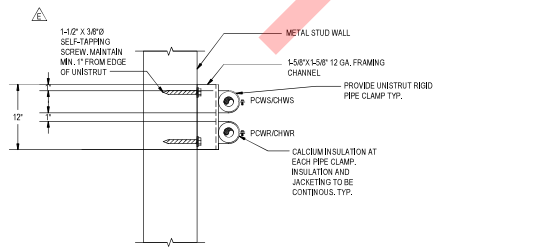
4 **CHILLED WATER HORIZONTAL SUPPORT**
SCALE: NTS



5 **PCW AND CHW HORIZONTAL SUPPORT**
SCALE: NTS



6 **HORIZONTAL SUPPORT CEILING ATTACHMENT**
SCALE: NTS



7 **PROCESS COOLING WATER/CHILLED WATER WALL SUPPORT 2**
SCALE: NTS

DRAFT

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04		MP0.01

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ENGR	DATE	APPROVALS	DATE
DES			
CHKR			

B999
OPTICS LAB DESIGN
MECHANICAL
PIPING COVER SHEET

DRAWING NUMBER	REVISION
B0999-MP0-0126	F E

B0999-MP0-0126 - F E

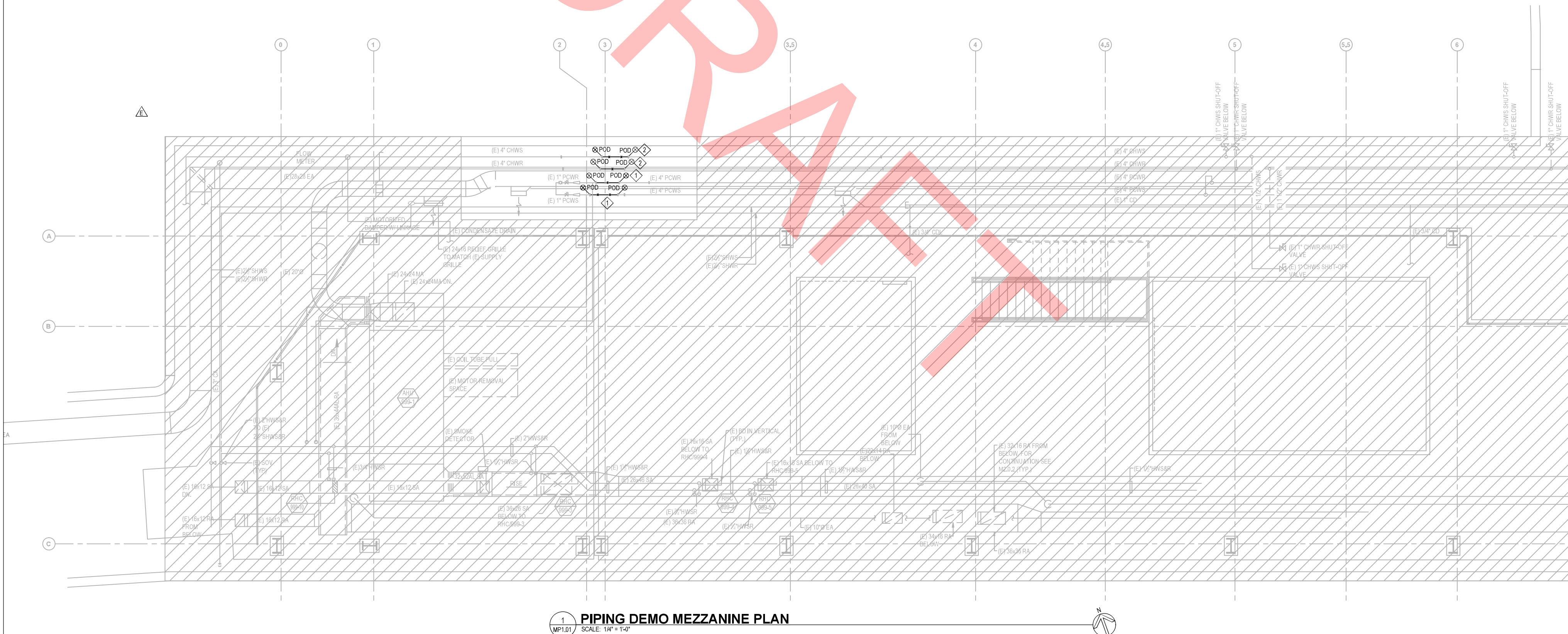
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

PLAN GENERAL NOTES

1. EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2. COORDINATE LOCATION OF EXISTING DUCTWORK AND NEW DUCTWORK WITH OTHER TRADES.
3. CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.
4. CONTRACTOR TO DRAIN SYSTEM AS NECESSARY. COORDINATE WITH SLAC. E

MECHANICAL SHEET NOTES

1. DEMO AND CAP EXISTING 4"Ø PROCESS COOLING WATER SUPPLY AND RETURN PIPE SECTION FOR FUTURE TEE FITTING INSTALLATION.
2. DEMO AND CAP EXISTING 4"Ø CHILLED WATER SUPPLY AND RETURN PIPE SECTION FOR FUTURE TEE FITTING INSTALLATION.



PIPING DEMO MEZZANINE PLAN

1 MP1.01 SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (IFC)
DATE: 5/31/2026 PRS#: 26-18
Revised Authorization ☑ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH. (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER MENG-HSIU CHEN M19582 EXP. 9/30/27 MECHANICAL STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | MP1.01

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ENGR CHEN, MENG-HSIU 05-18-2026
DES TRAN, KEVIN 05-18-2026
CHKR LI, JIMMY 05-18-2026
APPROVALS DEROSSETT, HANNAH DATE 05-18-2026

B999
OPTICS LAB DESIGN
MECHANICAL
PIPING DEMO MEZZANINE PLAN

DRAWING NUMBER B0999-MD1-0127 REVISION F E

B0999- MD1- 0127- F E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

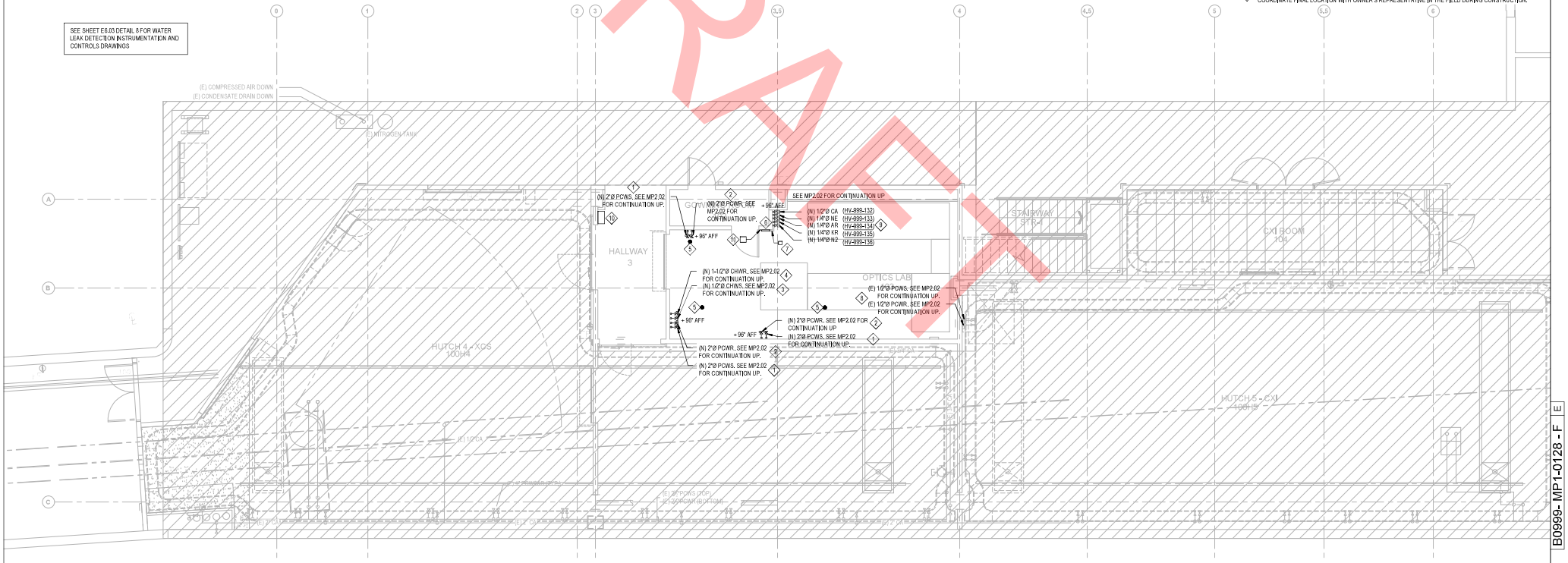
PLAN GENERAL NOTES

1. EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2. NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3. CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.
4. VALVES SHOWN ON THIS SHEET SHALL BE LOCATED +96" AFF UNLESS INSTRUCTED OTHERWISE BY SLAC OWNER'S REPRESENTATIVE. CONTRACTOR SHALL COORDINATE FINAL LOCATION OF VALVES WITH OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.

MECHANICAL SHEET NOTES

1. NEW 2"Ø PROCESS COOLING WATER SUPPLY SHUT-OFF VALVE FOR FUTURE CONNECTION. PROVIDE AIR TIGHT GASKET AT CEILING TILE PENETRATION.
2. NEW 2"Ø PROCESS COOLING WATER RETURN SHUT-OFF VALVE FOR FUTURE CONNECTION. PROVIDE AIR TIGHT GASKET AT CEILING TILE PENETRATION.
3. NEW 1-1/2"Ø CHILLED WATER SUPPLY SHUT-OFF VALVE FOR FUTURE CONNECTION. PROVIDE AIR TIGHT GASKET AT CEILING TILE PENETRATION.
4. NEW 1-1/2"Ø CHILLED WATER RETURN SHUT-OFF VALVE FOR FUTURE CONNECTION. PROVIDE AIR TIGHT GASKET AT CEILING TILE PENETRATION.
5. NEW SEAHAWK SD-Z FLOOR MOUNTED WIRED WATER LEAK DETECTOR. CONNECT TO NEW SEAHAWK LDRA6 ZONE CONTROLLER. SEE E3.02 FOR MORE INFORMATION. CONTRACTOR TO COORDINATE FINAL LOCATION WITH OWNER'S REPRESENTATIVE IN THE FIELD DURING CONSTRUCTION. COORDINATE WITH ELECTRICAL FOR MORE INFORMATION.
6. NEW SEAHAWK LDRA6 CONTROLLER. COMPLETE WITH WALL-MOUNTED NEMA 1 ENCLOSURE AT +60" AFF. SEE SHEET E3.02 FOR MORE INFORMATION. CONNECT TO EXISTING ALC FOR CONTROLS AND MONITORING. CONTRACTOR TO COORDINATE FINAL LOCATION WITH OWNER'S REPRESENTATIVE IN THE FIELD DURING CONSTRUCTION. REFER TO DIVISION 23 45 00 FOR SEQUENCE OF OPERATIONS.
7. NEW EMERGENCY PULL BUTTON, FOR LEAK DETECTION SYSTEM. CONNECT TO EXISTING ALC. CONTRACTOR TO COORDINATE FINAL LOCATION WITH OWNER'S REPRESENTATIVE IN THE FIELD DURING CONSTRUCTION.
8. RE-USE EXISTING 1/2"Ø PROCESS COOLING WATER SUPPLY SHUT-OFF VALVE AND RETURN SHUT-OFF VALVE PIPING FOR FUTURE VACUUM PUMP.
9. NEW TYPICAL 1/2"Ø AND 1/4"Ø PIPE DROP WITH STUB-OUT SHUT-OFF VALVES. INCLUDE END CAPS AFTER INSTALLATION. PROVIDE AIR TIGHT GASKET AT CEILING TILE PENETRATION.
10. NEW VALVE CONTROL ENCLOSURE. SEE 1/E3.02 FOR MORE INFORMATION.
11. NEW RS485 TO BACNET IP PROTOCOL CONVERTER. SEE E3.02 FOR MORE INFORMATION. CONTRACTOR TO COORDINATE FINAL LOCATION WITH OWNER'S REPRESENTATIVE IN THE FIELD DURING CONSTRUCTION.

SEE SHEET E6.03 DETAIL 8 FOR WATER LEAK DETECTION INSTRUMENTATION AND CONTROLS DRAWINGS



1 MP2.01 **PIPING FLOOR PLAN**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC National Accelerator Laboratory
Construction Authorization (CA)
BR: mm/dd
DATE: 10/1/2020 FROM: Dan Li
Revised Authorization ☐ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER M19582 EXP. 9/30/27 MECHANICAL

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04		MP2.01

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ENGR	DES	CHKR
CHEN, HSIN-CHIEH	TSAI, WEI-AN	LI, MAY

DATE	APPROVALS	DATE
05-18-2026	DERISSETTI, MARIANA	05-18-2026

B999
OPTICS LAB DESIGN
MECHANICAL
PIPING FLOOR PLAN

DRAWING NUMBER: B0999-MP1-0128 | REVISION: F | E

B0999- MP1-0128 - F | E

DRAFT

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

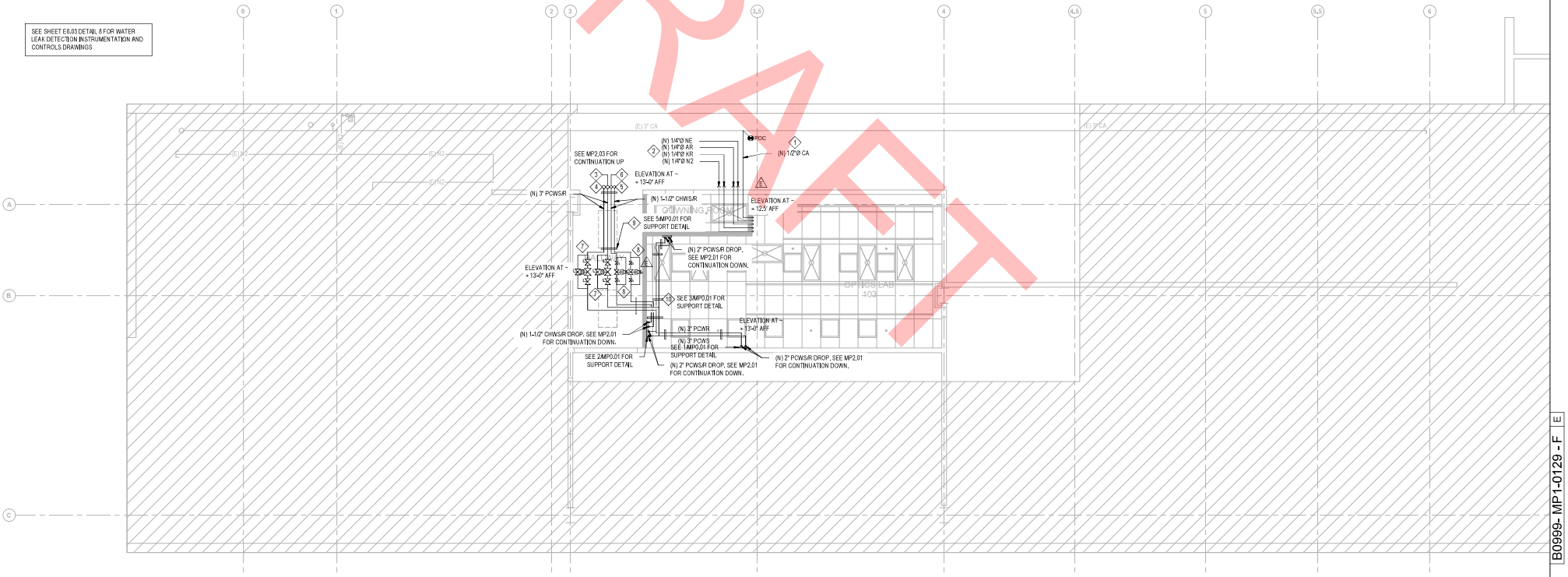
PLAN GENERAL NOTES

1 EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2 NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3 CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.
4 PROVIDE UNISTRUT PIPE SUPPORT EVERY 10' FOR 2" AND LARGER PIPING AND 8' FOR 1-1/2" AND SMALLER PIPING PER CPC 2022 TABLE 313.3.

MECHANICAL SHEET NOTES

1. PROVIDE NEW 1/2"Ø COMPRESSED AIR LINE TO NEW OPTICS LAB WITH SHUT-OFF VALVE STUB-OUT FROM EXISTING. SLAC TO BE RESPONSIBLE FOR CONNECTION FROM SHUTOFF VALVE WITHIN OPTICS LAB.
2. NEW 1/4"Ø NITROGEN, ARGON, KRYPTON, AND NEON GAS TO OPTICS LAB. PIPES ARE TO BE CAPPED AT HALLWAY SIDE AND AFTER SHUT-OFF STUB-OUTS WITHIN THE OPTICS. SLAC TO CONFIRM SOURCE LOCATION AND PROVIDE CONNECTION FROM SOURCE TO CAPPED PIPING IN THE HALLWAY. SLAC IS ALSO RESPONSIBLE FOR CONNECTION FROM SHUTOFF VALVE WITHIN OPTICS LAB. FIELD VERIFY TO AVOID ANY OBSTRUCTIONS.
3. NEW 3"Ø PROCESS COOLING WATER SUPPLY TO NEW OPTICS LAB AT. COORDINATE WITH SLAC FOR EXACT LOCATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS.
4. NEW 3"Ø PROCESS COOLING WATER RETURN TO NEW OPTICS LAB. COORDINATE WITH SLAC FOR EXACT LOCATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS.
5. NEW 1-1/2"Ø CHILLED WATER SUPPLY TO NEW OPTICS LAB. COORDINATE WITH SLAC FOR EXACT LOCATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS.
6. NEW 1-1/2"Ø CHILLED WATER RETURN TO NEW OPTICS LAB. COORDINATE WITH SLAC FOR EXACT LOCATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS.
7. NEW 3"Ø PROCESS COOLING WATER ACTUATED MOTORIZED VALVE AND BYPASS. OPEN/CLOSE INDICATOR SHALL BE FACE DOWN TOWARDS THE FLOOR. CONNECT ACTUATED MOTORIZED VALVE TO THE BUILDING ALC. SEE SHEET E3.02 FOR CONNECTION TO ALC AND LOCATION OF CONTROL PANEL. REFER TO SPECIFICATION 28 45 00 FOR MORE INFORMATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS. I&C CONTRACTOR TO SUBMIT ON EXACT MAKE/MODEL. RCEL & TRIAC CONTROLS ACTUACTORS ARE RECOMMENDED.
8. NEW 1-1/2"Ø CHILLED WATER ACTUATED MOTORIZED VALVE AND BYPASS. OPEN/CLOSE INDICATOR SHALL BE FACE DOWN TOWARDS THE FLOOR. CONNECT ACTUATED MOTORIZED TO THE BUILDING ALC. SEE SHEET E3.02 FOR CONNECTION TO ALC AND LOCATION OF CONTROL PANEL. REFER TO SPECIFICATION 28 45 00 FOR MORE INFORMATION. FIELD VERIFY ROUTING FOR ANY OBSTRUCTIONS. I&C CONTRACTOR TO SUBMIT ON EXACT MAKE/MODEL. RCEL & TRIAC CONTROLS ACTUACTORS ARE RECOMMENDED.
9. NEW 1-5/8"X1-5/8"X20" UNISTRUT PIPE SUPPORT.
10. NEW 1-5/8"X1-5/8"X12" UNISTRUT PIPE SUPPORT.

SEE SHEET E6.03 DETAIL 8 FOR WATER LEAK DETECTION INSTRUMENTATION AND CONTROLS DRAWINGS



1 MP2.02 **PIPING RCP**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

M 19582
EXP. 9/30/27

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | MP2.02

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ENGR	DATE	APPROVALS	DATE
DES		DERGOSETT, HANNAH	
CHKR			

B999
OPTICS LAB DESIGN
MECHANICAL
PIPING RCP

DRAWING NUMBER: B0999-MP1-0129 | REVISION: F | E

B0999- MP1-0129 - F | E

DRAFT

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

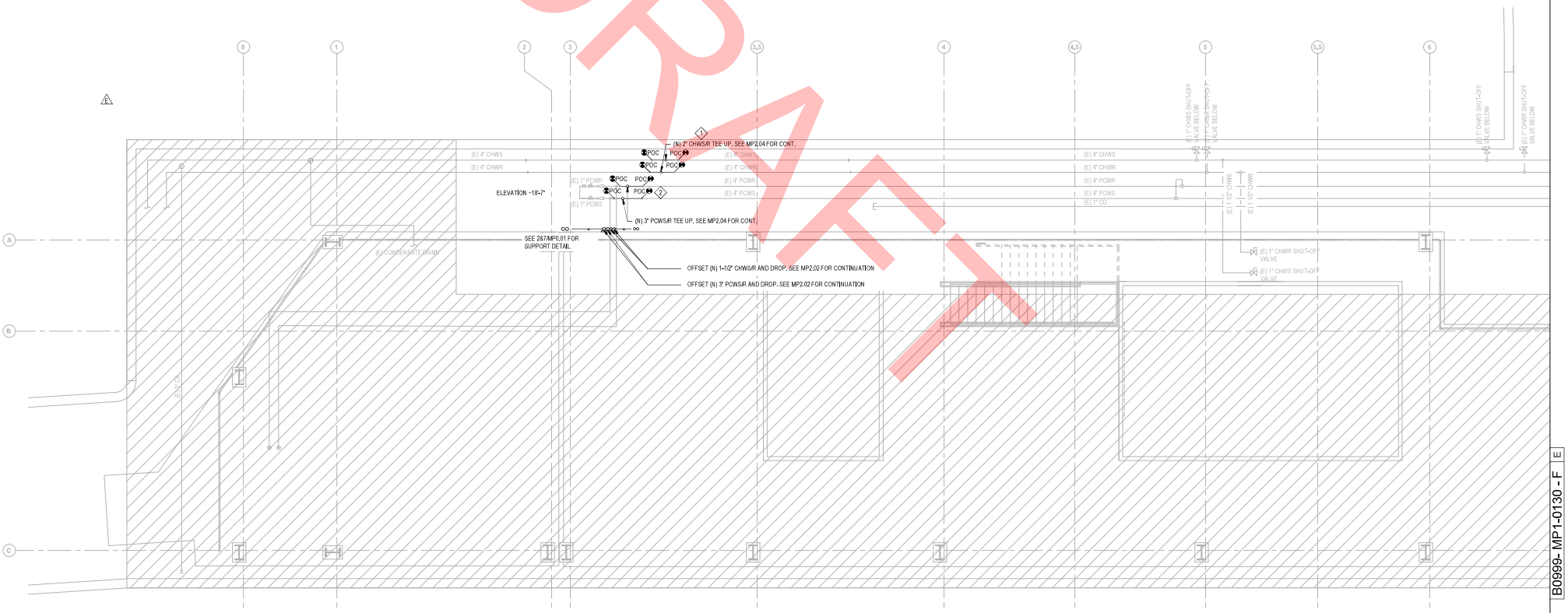
PLAN GENERAL NOTES

1 EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2 NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3 CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.

MECHANICAL SHEET NOTES

1 PROVIDE NEW 4"Ø CHILLED WATER SUPPLY AND RETURN PIPING SECTION WITH INSULATION AND NEW 2"Ø TEE-FITTING UPWARDS. FIELD VERIFY FOR ANY OBSTRUCTIONS.

2 PROVIDE NEW 4"Ø PROCESS COOLING WATER SUPPLY AND RETURN PIPING SECTION WITH NEW 3"Ø TEE-FITTING UPWARDS. FIELD VERIFY FOR ANY OBSTRUCTIONS.



1 MP2.03 **PIPING MEZZANINE PLAN**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC sup.pipe.pan.cr.pipe.cr.pipe
Construction Authorization (PC)
RR: [illegible]
DATE: 10/1/2026 FROM: [illegible]
Revised Authorization ☒ No ☐ Yes
This is a Construction Authorization Form and is not a Permit to Work. Please see Revision Form for any changes made, revisions or other requirements.
Please contact the Authorization Form Owner (Sub-Owner) for any changes in the Authorization Form or any other requirements, revisions or other requirements.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH. (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER
M19582
EXP. 9/30/27
MECHANICAL

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04		MP2.03

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B999
OPTICS LAB DESIGN
MECHANICAL
PIPING MEZZANINE PLAN

ENGR	DATE	APPROVALS	DATE
CHEN, HENG-HSU	05-04-2026	DEROSSETT, HANNAH	05-04-2026
DES	05-04-2026		
CHKR	05-04-2026		

DRAWING NUMBER: B0999-MP1-0130 | REVISION: F | E

B0999- MP1-0130 - F | E

DRAFT

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026

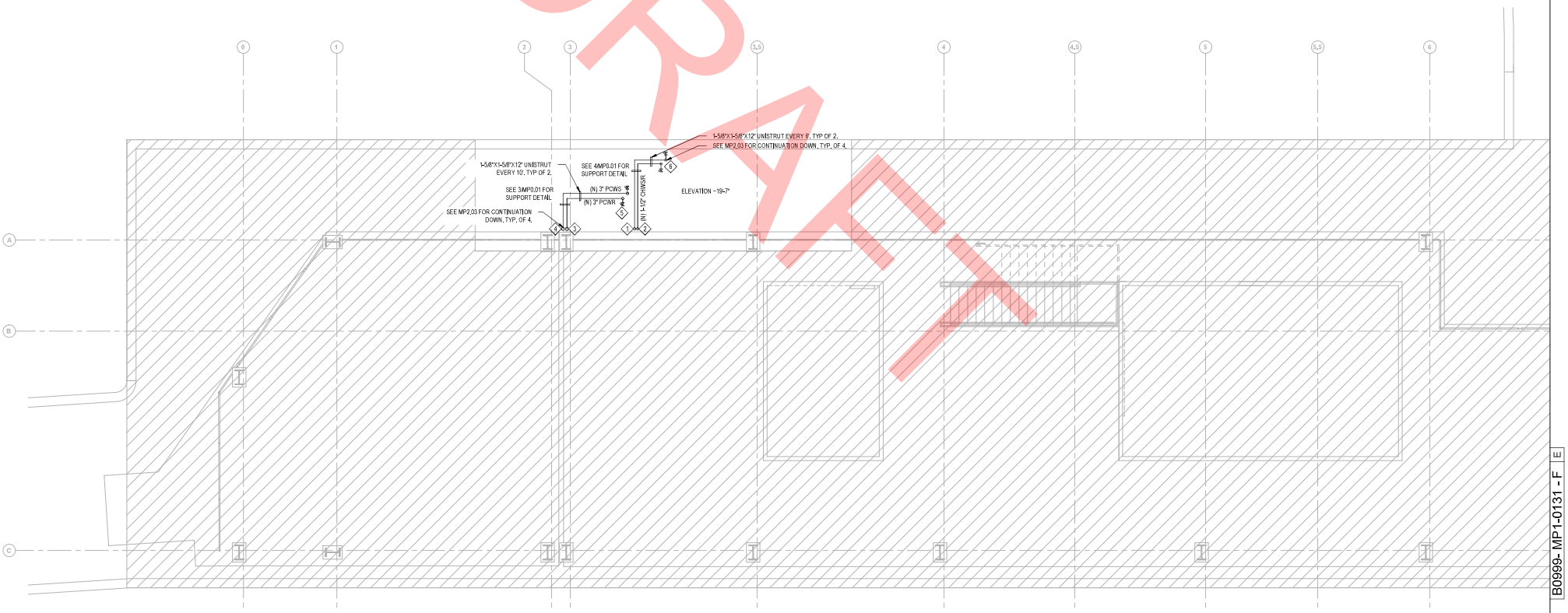
PLAN GENERAL NOTES

1 EXISTING MECHANICAL TO REMAIN WORK IS INDICATED BY BEING SHOWN LIGHT.
2 NEW MECHANICAL ITEMS ARE INDICATED BY BEING SHOWN BOLD.
3 CONTRACTOR SHALL COORDINATE WITH FINAL INSPECTION OF COMPLETED WORK WITH DESIGN ENGINEER AND SLAC REPRESENTATIVE, FOR FINAL APPROVAL AND ACCEPTANCE.

MECHANICAL SHEET NOTES

1 PROVIDE NEW 1-1/2"Ø CHILLED WATER SUPPLY PIPING DOWN. FIELD VERIFY TO AVOID ANY OBSTRUCTIONS. SEE SHEET 2.06 FOR CONTINUATION.
2 PROVIDE NEW 1-1/2"Ø CHILLED WATER RETURN PIPING WITH INSULATION DOWN. FIELD VERIFY TO AVOID ANY OBSTRUCTIONS. SEE SHEET MP2.03 FOR CONTINUATION.
3 PROVIDE NEW 3"Ø PROCESS COOLING WATER SUPPLY PIPING WITH INSULATION DOWN. FIELD VERIFY TO AVOID ANY OBSTRUCTIONS. SEE SHEET MP2.03 FOR CONTINUATION.
4 PROVIDE NEW 3"Ø PROCESS COOLING WATER RETURN PIPING DOWN. FIELD VERIFY TO AVOID ANY OBSTRUCTIONS. SEE SHEET MP2.03 FOR CONTINUATION. (E)
5 PROVIDE NEW 3"Ø PROCESS COOLING WATER RISER, STUB-OUT NEW 3" SHUT-OFF VALVES, FIELD VERIFY TO AVOID ANY OBSTRUCTION. COORDINATE EXACT LOCATION WITH SLAC. (A)
6 PROVIDE NEW 2"Ø CHILLED WATER RISER, STUB-OUT NEW 2" SHUT-OFF VALVES, FIELD VERIFY TO AVOID ANY OBSTRUCTION. COORDINATE EXACT LOCATION WITH SLAC.

DRAFT



1/MP2.04 **PIPING ABOVE MEZZANINE PLAN**
SCALE: 1/4" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit plan comps
Construction Authorization (AFC)
BY: mmiller
DATE: 10/1/2026 FROM: 2026
Revised Authorization ☒ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

REGISTERED PROFESSIONAL ENGINEER
M19582
EXP. 9/30/27
MECHANICAL

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | MP2.04

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		DATE	APPROVALS	DATE
ENGR	CHEN, HSIN-CHIEH	05-18-2026		
DES	TSENG, MICHAEL	05-18-2026	DEROSSETT, HANNAH	05-19-2026
CHKR	LI, MARY	05-18-2026		

B999
OPTICS LAB DESIGN
MECHANICAL
PIPING ABOVE MEZZANINE PLAN

DRAWING NUMBER B0999-MP1-0131 | REVISION F | E

B0999- MP1-0131 - F | E

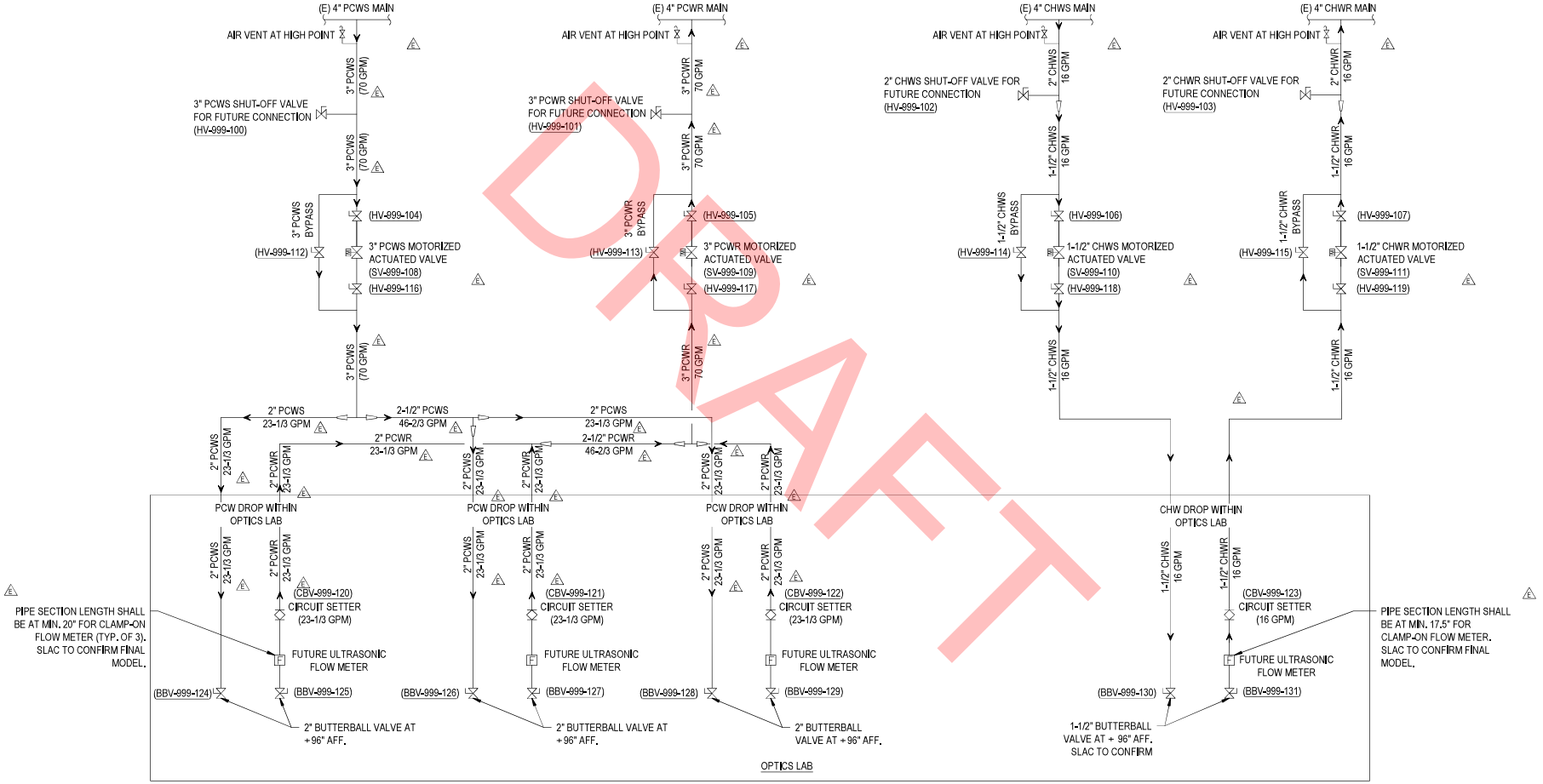
PLAN GENERAL NOTES

1 VALVES SHOWN ON THIS SHEET SHALL BE LOCATED +96" AFF UNLESS INSTRUCTED OTHERWISE BY SLAC OWNER'S REPRESENTATIVE. CONTRACTOR SHALL COORDINATE FINAL LOCATION OF VALVES WITH OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.

2 SEE SHEET E6.03 FOR CONTROLS SCOPE.

3 HVAC SYSTEMS (INCLUDING HYDRONIC) SHALL BE BALANCED IN ACCORDANCE WITH ABC, ACCA MANUAL B, ASHRAE 111, NEBB, OR SMACNA STANDARDS. THE BALANCE REPORT IS TO BE PROVIDED TO THE FIELD INSPECTOR. 314.1.

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	KT	JL	MHC	12-02-2025
B	60% CD	KT	JL	MHC	12-15-2025
C	90% CD	KT	JL	MHC	01-06-2026
D	100% CD	KT	JL	MHC	02-04-2026
E	F&O AND BIO REVIEW	KT	JL	MHC	05-01-2026
F	F&O AND BIO REVIEW	KT	JL	MHC	05-18-2026



1 MP3.00 **P&ID**
SCALE: NTS

DRAFT

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

MHC ENGINEERS
150 8TH STREET
SAN FRANCISCO, CA 94103
PH: (415) 512-7141
FAX (415) 512-7120

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04	MP3.00

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B999
OPTICS LAB DESIGN
MECHANICAL
P&ID

ENGR	DES	CHKR	APPROVALS	DATE
CHEN, HSIN-CHIEH	TS-HS, KEVIN	LI, MAY	DERISSETTI, HANNAH	

DRAWING NUMBER: B0999-MP6-0132 | REVISION: F | E

B0999-MP6-0132 - F | E

CONTROLS

SYMBOL	DESCRIPTION
	SOLENOID OPEN VALVE
	INDUCTOR
	RESISTOR
	DIODE
	BATTERY
	THERMAL OVERLOAD
STOP	PUSH BUTTON SWITCH – MAINTAINED CONTACT, MUSHROOM HEAD.
	CONTACT – SINGLE POLE DOUBLE THROW.
H OFF A	HAND-OFF-AUTO SWITCH
	PUSH BUTTON
P	PILOT LIGHT
PF	POWER FACTOR METER
R	RELAY
	CAPACITOR – ADJUSTABLE OR FIXED
	CONTACT – NORMALLY OPEN OR NORMALLY CLOSED.
	LEVEL SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.
	PRESSURE SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.
	FLOW SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.
	TEMPERATURE SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.
	PUSH BUTTON SWITCH – MOMENTARY CONTACT, NORMALLY OPEN OR NORMALLY CLOSED.
	RELAY CONTACT – TIME DELAY OPEN, INSTANTANEOUS CLOSED OR TIME DELAY CLOSED, INSTANTANEOUSLY OPEN.
	RELAY CONTACT – INSTANTANEOUS OPEN, TIME DELAY CLOSED OR INSTANTANEOUS CLOSED. TIME DELAY OPEN.
	LIMIT SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.
	SWITCH – NORMALLY OPEN OR NORMALLY CLOSED.

FIRE ALARM SYMBOLS

SYMBOL	DESCRIPTION
S	INTERIOR SPEAKER +80" AFF, TO BOTTOM OF DEVICE, OR 6" BELOW CEILING, WHICHEVER IS LOWER OR NOT GREATER THAN 96"AFF TO TOP OF DEVICE. x = NOTIFICATION APPLIANCE CIRCUIT NUMBER (V=VOICE) y = DEVICE NUMBER WP = WEATHERPROOF (OPTIONAL)
F	SPEAKER/STROBE, +80" AFF, TO BOTTOM OF DEVICE, OR 6" BELOW CEILING, WHICHEVER IS LOWER OR NOT GREATER THAN 96"AFF TO TOP OF DEVICE. x = NOTIFICATION APPLIANCE CIRCUIT NUMBER (V=VOICE) y = DEVICE NUMBER w = NOTIFICATION APPLIANCE CIRCUIT NUMBER (S=STROBE) z = DEVICE NUMBER
HF xxcd	ALARM STROBE, XX CANDELA
SD	ADDRESSABLE PHOTELECTRIC SMOKE DETECTOR

SINGLE-LINE DIAGRAM

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	ENCLOSED CIRCUIT BREAKER
ST	CIRCUIT BREAKER WITH SHUNT TRIP
	DRAW-OUT CIRCUIT BREAKER
	DRAW-OUT FUSED SWITCH
XA	VACCUM CIRCUIT BREAKER
M	UTILITY METER
	MAGNETIC STARTER – NEMA SIZE AS INDICATED FVNR UNLESS 2S1W, 2S2W OR FVNR INDICATED
	CONTROL TRANSFORMER WITH FUSING
	COMBINATION MOTOR STARTER/DISCONNECT
LA	LIGHTNING ARRESTER
	DISCONNECT
	FUSE DISCONNECT
	DELTA GROUNDED – "Y" CONNECTED
	DELTA – DELTA CONNECTED
	CURRENT TRANSFORMER
(3)	POTENTIAL TRANSFORMER (NUMBER INDICATES QUANTITY)
	NEUTRAL LINK
	MEDIUM VOLTAGE CABLE TERMINATION
	DRAW OUT
	GROUND
	CHASSIS
	FUSE
M	AC MOTOR WITH THERMAL MANUAL STARTER
K	KIRK KEY INTERLOCK
V	VOLTMETER
A	AMMETER
KW	KILOWATT-METER
GFI	GROUND FAULT INTERRUPTER
VFD	VARIABLE FREQUENCY DRIVE
VFD	VARIABLE FREQUENCY DRIVE W/BYPASS
	CONTINUOUS GROUND BUS
	TRANSFORMER
N E	AUTOMATIC TRANSFER SWITCH
G	ENGINE GENERATOR
	PANELBOARD

LIGHTING PLAN

SYMBOL	DESCRIPTION
	2x4 SURFACE MOUNTED LIGHT FIXTURE
	2x2 SURFACE MOUNTED LIGHT FIXTURE
	1x4 SURFACE MOUNTED LIGHT FIXTURE
	2x4 RECESSED MOUNTED LIGHT FIXTURE
	2x2 RECESSED MOUNTED LIGHT FIXTURE
	1x4 RECESSED MOUNTED LIGHT FIXTURE
	2x4 RECESSED MOUNTED EMERGENCY/NIGHT LIGHT FIXTURE
	2x2 RECESSED MOUNTED EMERGENCY/NIGHT LIGHT FIXTURE
	1x4 RECESSED MOUNTED EMERGENCY/NIGHT NIGHT FIXTURE
	8 FT. LONG PENDANT MOUNTED STRIP LIGHT FIXTURE
	4 FT. LONG PENDANT MOUNTED STRIP LIGHT FIXTURE
	8 FT. LONG SURFACE MOUNTED STRIP LIGHT FIXTURE
	4 FT. LONG SURFACE MOUNTED STRIP LIGHT FIXTURE
	8 FT. LONG PENDANT MOUNTED EMERGENCY/NIGHT LIGHT STRIP
	4 FT. LONG PENDANT MOUNTED EMERGENCY/NIGHT LIGHT STRIP
	TRACK LIGHTS
	RECESSED DOWNLIGHT
	RECESSED DOWNLIGHT ON EMERGENCY CIRCUIT
	SURFACE MOUNTED DOWNLIGHT
	SURFACE MOUNTED DOWNLIGHT ON EMERGENCY CIRCUIT
	RECESSED WALL-WASH DOWNLIGHT
	SURFACE WALL-WASH DOWNLIGHT
	WALL MOUNTED LIGHT FIXTURE
	WALL MOUNTED EMERGENCY LIGHT FIXTURE
	CEILING AND WALL MOUNTED EXIT LIGHT WITH DOUBLE FACE ARROW INDICATES DIRECTION
	CEILING AND WALL MOUNTED EXIT LIGHT WITH SINGLE FACE ARROW INDICATES DIRECTION
	EMERGENCY EXIT LIGHT WITH BATTERY BACK UP
	EMERGENCY EXIT LIGHT WALLPACK COMBO
OS	CEILING MOUNTED OCCUPANCY SENSOR
OS	CEILING MOUNTED OCCUPANCY SENSOR W/POWER PACK
OS	WALL MOUNTED OCCUPANCY SENSOR
OS	WALL MOUNTED OCCUPANCY SENSOR W/POWER PACK
OS a	OCCUPANCY SENSOR, WALL MOUNTED, SMALL LETTER INDICATES SWITCH LEG FOR CONTROL
OS ab	COMBINE OCCUPANCY SENSOR AND DUAL RELAY SWITCH, SMALL LETTERS INDICATE SWITCH LEG FOR CONTROL
PC	PHOTO ELECTRIC CELL
$	LINE VOLTAGE MANUAL SWITCH
$$	DUAL POLE SWITCH, 277V LINE
$TM	TIMER SWITCH WITH 1-HR RANGE
$3 A	THREE-WAY SWITCH, SMALL LETTER INDICATES SWITCH LEG FOR CONTROL
$LV A	LOW VOLTAGE MANUAL SWITCH
S	SENTRY SWITCH
D	DIMMER SWITCH
	WALL SCONCE
	WALL MOUNTED FLOOD LIGHT
	PENDANT MOUNTED HIGH BAY LIGHT FIXTURE
	WALL MOUNTED EXTERIOR LIGHT
	POLE MOUNTED STREET/PARKING SINGLE HEAD ROUND FIXTURE
	POLE MOUNTED STREET/PARKING DOUBLE HEAD ROUND FIXTURE
	POLE MOUNTED STREET/PARKING SINGLE HEAD SQUARED FIXTURE
	POLE MOUNTED STREET/PARKING DOUBLE HEAD SQUARED FIXTURE

POWER PLAN

SYMBOL	DESCRIPTION
	DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE – GFCI ABOVE BACKSPLASH
	DOUBLE DUPLEX RECEPTACLE
	SPECIAL PURPOSE OUTLET
	DUPLEX RECEPTACLE, FLUSH IN FLOOR
	DOUBLE DUPLEX RECEPTACLE, FLUSH IN FLOOR
	COMBINATION POWER AND SIGNAL, FLUSH IN FLOOR
	PUSH BUTTON
S	SOLENOID VALVE
T	WALL MOUNTED THERMOSTAT
J	WALL MOUNTED JUNCTION BOX
J	CEILING MOUNTED JUNCTION BOX
J	FLOOR MOUNTED JUNCTION BOX
PP J	POWER POLE
$M	MANUAL MOTOR STARTER SWITCH
	DISCONNECT SWITCH – NON FUSED
	DISCONNECT SWITCH – FUSED
	DISCONNECT SWITCH (ENCLOSED CIRCUIT BREAKER)
	ENCLOSED STARTER
	COMBINATION MAGNETIC MOTOR STARTER WITH FUSES
M	CONNECTION POINT TO MOTOR SPECIFIED, SUPPLIED, AND INSTALLED UNDER OTHER DIVISIONS, RACEWAY, CONDUCTORS, AND CONNECTIONS UNDER THIS DIVISION. REFER TO ONE-LINE OR SCHEDULE
AVT	ABSENCE OF VOLTAGE TESTER
MH	MANHOLE
PB	PULLBOX
	GROUND ROD
	AIR TERMINAL
	TEST WELL
GND	GROUND BUS
	208/120V PANELBOARD, SURFACE MOUNTED
	208/120V PANELBOARD, RECESSED MOUNTED
	480/277V PANELBOARD, SURFACE MOUNTED
	480/277V PANELBOARD, RECESSED MOUNTED
	CABINET ENCLOSURE, SURFACE MOUNTED
	CABINET ENCLOSURE, RECESSED MOUNTED
T	TRANSFORMER
	CEILING FAN
	SURFACE MOUNTED WIREWAY (WIREMOLD)
	EQUIPMENT CONNECTION
	CONDUIT CONNECTION
	FLEX CONDUIT
	GUY WIRE POLE
	UTILITY POLE
—G—	CADWELD GROUND CONNECTION
—G—	GROUND CABLE
	CONDUIT SEAL, "EYS" SERIES, FILLED WITH COMPOUND.
	CONDUIT TURNING – UP
	CONDUIT TURNING – DOWN
	CONDUIT STUBBED AND CAPPED, LOCATION AS INDICATED
—C—	DUCTBANK, SITE PLAN C=CONTROL, E=EMERGENCY POWER, P=POWER, T=TELEPHONE/DATA, U=UTILITY COMPANY
	CONDUIT WITH CONDUCTORS – CONCEALED OR EXPOSED
	CONDUIT WITH CONDUCTORS – BELOW GRADE OR SLAB
—E—	CONDUIT AND CONDUCTORS ON EMERGENCY CIRCUIT
—CO—	CONDUIT ONLY
—DB—	DUCT BANK
—BD—	BUS DUCT
	PLUG-IN CIRCUIT BREAKER ON THE BUS DUCT, SIZE AS NOTED ON THE PLAN
ISOLATION GND; GND; CIRCUIT HOMERUN; HOT WIRES; NEUTRAL; IG	HOMERUN TO SWITCHBOARD, PANELBOARD, PANEL & CABINET, ETC.

TELECOMMUNICATION AND LOW VOLTAGE

SYMBOL	DESCRIPTION
	TELEPHONE OUTLET – WALL MOUNTED
	TELEPHONE OUTLET – FLUSH IN FLOOR
	DATA OUTLET – WALL MOUNTED x = NUMBER OF PORTS
	DATA OUTLET – FLUSH IN FLOOR
	TEL/DATA – WALL MOUNTED
	TEL/DATA – FLUSH IN FLOOR
CP J	COMMUNICATION POLE
T	TELEPHONE BACKBOARD

ABBREVIATIONS

ABB	DESCRIPTION
A	AMMETER, AMPERE
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ANN	ANNUNCIATOR
AL	ALUMINUM
ARF	ABOVE RAISED FLOOR
AS	AMMETER SWITCH
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AVT	ABSENCE OF VOLTAGE TESTER
BRKR	BREAKER
BLDG	BUILDING
B.O.C	BOTTOM OF CONCRETE
B.O.D	BOTTOM OF DUCT
B.O.P	BOTTOM OF PIPE
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED-CIRCUIT TELEVISION
CEC	CALIFORNIA ELECTRICAL CODE
CKT	CIRCUIT
CM	CONSTRUCTION MANAGER
CO	CONDUIT ONLY
CPT	CONTROL POWER TRANSFER
CR	CONTROL RELAY
CRS	COATED RIGID STEEL
CSRM	CONST. SAFETY REQMT. MANUAL
CT	CURRENT TRANSFORMER
CU	COPPER
DB	DUCT BANK
DC	DIRECT CURRENT
DIV	DIVISION
DPDT	DOUBLE POLE, DOUBLE THROW
E	EMPTY, EMERGENCY
(E)	EXISTING
EC	ELECTRICAL CONTRACTOR
EG	ENGINE GENERATOR
EMO	EMERGENCY MANUAL OFF
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
ENT	ELECTRICAL NONMETALLIC TUBING
EOL	END OF LINE
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
F	FUSE
FA	FIRE ALARM
FC	FOOT CANDLE
(F)	FUTURE
FDR	FEEDER
FLA	FULL LOAD AMPS
FLR	FLOOR
FSD	FIRE SMOKE DETECTOR
FT	FEET, FOOT
FU	FUSE
FVNR	FULL VOLTAGE NONREVERSING
FVR	FULL VOLTAGE REVERSING
(G)	GROUND
G, GND	GROUND
GFI	GROUND FAULT INTERRUPTER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
GRC	GALVANIZED RIGID CONDUIT
H	HORN
HH	HANDHOLE
HID	HIGH-INTENSITY DISCHARGE
HOA	HAND-OFF-AUTO
HTR	HEATER
HT	HEIGHT
ID	INSIDE DIAMETER
IMC	INTERMEDIATE METALLIC CONDUIT
IG	ISOLATED GROUND
I/O	INPUT-OUTPUT
JB	JUNCTION BOX
K	KIRK KEY INTERLOCK OR KEY OPERATED
KCMIL	THOUSAND CIRCULAR MILS
KA	KILOAMPERE
KVA	KILOVOLT-AMPERE
KVAR	KILOVOLT-AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR

ABB	DESCRIPTION
M	MAGNETIC. COIL OR CONTACT
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MFR	MANUFACTURER
MH	MANHOLE
MLO	MAIN LUGS ONLY
MO	MANUAL OPERATOR
MT, MTD	MOUNT, MOUNTED
MTR	MOTOR
(N)	NEW
(NL)	NEW LOCATION
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD RELAY
PB	PUSH BUTTON
PC	PHOTOCELL
PH	PHASE
PIV	POST INDICATOR VALVE
PL	PILOT LIGHT
PM	PROJECT MANAGER
PNL	PANEL
PVC	POLYVINYL CHLORIDE
QTY	QUANTITY
RCPT	RECEPTACLE
(RE)	RELOCATED EXISTING
RM	ROOM
RNC	RIGID NONMETALLIC CONDUIT
RQD	REQUIRED
(RR)	REMOVE AND REPLACE
RS	RIGID STEEL OR RAPID START
RVNR	REDUCED VOLTAGE NONREVERSING
RVR	REDUCED VOLTAGE REVERSING
SCP	SECURITY CONTROL PANEL
SMD	SEE MECHANICAL DRAWINGS
SPKR	SPEAKER
SPST	SINGLE POLE, SINGLE THROW
SS	STAINLESS STEEL
SSD	SEE STRUCTURAL DRAWINGS
SURF	SURFACE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
T	TRANSFORMER
TB	TERMINAL BLOCK
TBD	TO BE DETERMINED
TEL	TELEPHONE
TSP	TWISTED SHIELDED PAIR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTMETER, VOLT
VA	VOLT-AMPERE
VAR	VOLT-AMPERE REACTIVE
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WH	WATT-HOUR METER
WP	WEATHERPROOF
XP	EXPLOSIONPROOF-CLASS. DIVISION AND GROUP AS NOTED
XFMR	TRANSFORMER
Y	WYE CONNECTED
Z	IMPEDANCE
1φ	SINGLE PHASE
3φ	THREE PHASE

MOUNTING HEIGHTS

MOUNTING HEIGHT SHALL BE TO CENTER LINE (C/L) OF BOX, UNLESS OTHERWISE NOTED. WHERE BACK BOXES OF DIFFERENT SIZES ARE USED AND MOUNTED NEXT TO EACH OTHER OR ON THE SAME WALL, USE A COMMON CENTER LINE.

RECEPTACLES	18" TO C/L	VOLUME CONTROLS	48" TO C/L
RECEPTACLE WIREWAYS	43" TO C/L	THERMOSTATS	48" TO C/L
SWITCHES	48" TO C/L	TELE/COMMUNICATION OUTLET	18" TO C/L
MOTOR STARTERS	72" TO TOP	PANELBOARDS	72" TO TOP
DISCONNECTS	72" TO TOP	CABINETS	72" TO TOP
JUNCTION BOXES	18" TO C/L	FIRE ALARM PULL STATIONS	48" TO C/L

REFERENCE SYMBOLS

SYMBOL	DESCRIPTION
	DETAIL # / SHEET #
	SECTION # / SHEET #
	EQUIPMENT TAG # / SCHEDULE
	LIGHT FIXTURE # / WINDOW TAG #
	FEEDER TAG #
	REVISION #
	KEYED NOTE #
	POINT OF CONNECTION TO EXISTING (POC)
	ELEVATION DATUM
	EXISTING TO BE REMOVED (DEMOLISHED)
	EXISTING TO REMAIN
	NEW

GENERAL NOTES

1. THE COMPLETE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE, THE LATEST RULES AND REGULATIONS OF THE SAFETY ORDERS ISSUED BY THE DIVISION OF INDUSTRIAL SAFETY, THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), AND ALL APPLICABLE STATE AND LOCAL CODES ISSUED BY AUTHORITIES HAVING JURISDICTION.
2. LOCATION(S) OF ELECTRICAL EQUIPMENT AS SHOWN ON THE PLAN IS APPROXIMATE AND MAY BE CHANGED TO SUIT FIELD CONDITIONS AS DIRECTED BY THE CM.
3. UNLESS OTHERWISE NOTED, ALL GROUNDING/BONDING CONDUCTORS WIRE SHALL BE 4/0 AWG BARE COPPER.
4. INITIAL ENERGIZATION OF A NEW OR MODIFIED ELECTRICAL INSTALLATIONS REQUIRES AN ELECTRICAL ENERGIZATION READINESS REVIEW IN ACCORDANCE WITH ESH MANUAL CHAPTER 8 ELECTRICAL SAFETY MANUAL SECTION 7.2.15, AND THE CONSTRUCTION SAFETY REQUIREMENTS MANUAL (CSRM) SECTION 7. CONTACT THE SLAC CM FOR ASSISTANCE WITH THE READINESS REVIEW PROCESS AND REQUIREMENTS.
5. ALL ITEMS SHOWN ON NEW WORK DRAWINGS ARE NEW, U.O.N. ALL ITEMS SHOWN ON REMOVAL WORK DRAWINGS ARE EXISTING, U.O.N.
6. ONLY IRREVERSIBLE TYPES OF GROUNDING CONNECTORS SHALL BE USED. MECHANICAL CONNECTORS SHALL NOT BE USED FOR GROUNDING.
7. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL OFFSETS, BENDS, FITTINGS, JUNCTION BOXES, PULL BOXES, AND EXPANSION FITTINGS REQUIRED TO MEET FIELD CONDITIONS. CONTRACTOR SHALL DETERMINE ACTUAL MATERIAL AND HARDWARE REQUIREMENTS AND VERIFY ALL DIMENSIONS.
8. ELECTRICAL EQUIPMENT MUST BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY, SUCH AS UL, AND BE INSTALLED AND USED IN ACCORDANCE WITH ANY INSTRUCTIONS INCLUDED IN THE LISTING AND LABELING. EQUIPMENT THAT IS NOT LISTED AND LABELED, OR HAS BEEN MODIFIED, REQUIRES 3RD PARTY CERTIFICATION FROM A FIELD EVALUATION BODY APPROVED BY SLAC BIO.
9. INSPECTOR WILL VERIFY TORQUE TO SPECS ON CONDUCTOR TERMINATIONS, TRANSFORMERS, BREAKERS, PANELS, BUSWAY TAP CANS, WIRE CONNECTORS, BOLTED BUS CONNECTIONS, ETC. IF NO MARKINGS ARE PRESENT, USE THE VALUES IN NEC ANNEX I. TORQUE VALUES SHALL BE DEMONSTRATED IN THE PRESENCE OF THE INSPECTOR USING A CALIBRATED TOOL TO ACHIEVE THE INDICATED TORQUE VALUE OF THE EQUIPMENT. TYPICAL TORQUE WRENCH CALIBRATONS ARE VALID FOR A PERIOD OF SIX MONTHS OR 5,000 USES, WHICHEVER OCCURS FIRST. THE INSPECTION MUST BE DONE WITH THE EQUIPMENT IN A DE-ENERGIZED CONDITION.

DEMOLITION NOTES (CONTRACTORS)

1. ELECTRICAL DEMOLITION MUST BE PERFORMED IN ACCORDANCE WITH SLAC ELECTRICAL DEMOLITION REQUIREMENTS IN ESH MANUAL CHAPTER 8 ELECTRICAL SAFETY MANUAL SECTION 7.2.10 AND SECTION 7.3 OF THE CONSTRUCTION SAFETY REQUIREMENTS MANUAL (CSRM) SLAC-I-730-0A23L-003. AN ELECTRICAL DEMOLITION CHECKLIST/PERMIT IS REQUIRED. CONTACT THE SLAC CM FOR ASSISTANCE WITH PLANNING DEMOLITION WORK.

SLAC ELECTRICAL SAFETY PROCEDURES

1. NO ENERGIZED ELECTRICAL WORK IS ALLOWED. FOR ALL WORK REQUIRING LOTO, SLAC AUTHORIZED WORKERS SHALL LOCK FIRST THEN CONTRACTORS WILL LOCK OVER THE SLAC LOCK(S).
2. ALL BREAKER AND DISCONNECT OPERATION/SWITCHING SHALL BE PERFORMED BY SLAC QUALIFIED ELECTRICAL WORKERS. CONTACT THE FIELD CONSTRUCTION MANAGER FOR ASSISTANCE WITH SWITCHING AND BREAKER OPERATION.
3. COORDINATE INSTALLATION OF ARC-FLASH LABELS WITH ELECTRICAL EQUIPMENT BEFORE THE EQUIPMENT IS TIED INTO THE ELECTRICAL SUPPLY. AFTER EQUIPMENT IS TIED INTO THE ELECTRICAL SUPPLY, ACCESS TO THE EQUIPMENT SHALL BE CONTROLLED UNDER THE LOTO PROGRAM. ARC-FLASH LABELS SUPPLIED BY SLAC.
4. SEE CONSTRUCTION SAFETY REQUIREMENTS MANUAL (CSRM) FOR ELECTRICAL DEMOLITION REQUIREMENTS.
5. PRIOR TO ENERGIZATION OF ELECTRICAL EQUIPMENT OR JUNCTION BOXES WHERE SPLICES HAVE BEEN MADE, ALLOW SLAC ELECTRICIANS TO INSPECT INSTALLATION INCLUDING WIRING TERMINATION, WORKMENSHIP, TORQUE SEALS, ETC. OPEN COVERS & DEAD FRONTS FOR INSPECTION. COORDINATE WORK WITH SLAC CM.

SCOPE SUMMARY

1. TEMPORARILY REMOVE AND RETAIN (E) DISC. SWITCHES CONFLICTING W/INSTALLATION OF (N) XFMR STAND AT MEZZANINE LEVEL. COORDINATE REQUIRED OUTAGE W/SLAC OWNER REPRESENTATIVE.
2. INSTALL (N) HSS XFMR STAND. REINSTALL (E) DISC. SWITCHES AND PROVIDE (N) HARDWARE AS REQUIRED.
3. PROVIDE (N) XFMR ON (N) HSS XFMR STAND AT MEZZANINE LEVEL, PROVIDE (N) ELECTRICAL PANEL AT HALLWAY ON TUNNEL LEVEL, PROVIDE (N) XFMR SECONDARY ENCLOSED LSIG CIRCUIT BREAKER AND (N) FEEDERS. E
4. PROVIDE (N) FEEDERS AND (N) BRANCH CIRCUITS AS SHOWN ON PLANS. SPACE ABOVE THE GASKETED SUSPENDED CEILING OF THE (N) GOWNING ROOM AND OPTICS LAB SHALL BE REGARDED TO AS A PLENUM.
5. PROVIDE (N) VESDA SAMPLING PORT INITIATING DEVICES AT CEILING OF THE OPTICS LAB AND PROVIDE (N) VESDA SAMPLING TUBING AND (N) HARDWARE AS REQUIRED TO INTERCONNECT TO (E) VESDA SYSTEM AT HALLWAY.
6. INSTALL (E) HORN/STROBE NOTIFICATION APPLIANCES IN GOWNING ROOM AND OPTICS LAB.
7. INSTALL (E) SMOKE DETECTOR INITIATING DEVICE IN GOWNING ROOM.
8. PROVIDE (N) GROUNDING SYSTEM AND GROUND BARS.
9. PROVIDE (N) COMPLETE CEILING AND FLOOR MOUNTED LADDER CABLE TRAY SYSTEM WITH ALL REQUIRED HARDWARE. THE CONTRACTOR MAY REUSE AND REINSTALL (E) IDENTIFIED LADDER CABLE TRAY SECTION AS MUCH AS POSSIBLE.
10. PROVIDE (N) WIREMOLD AND (N) POWER STRIPS AS SHOWN ON PLANS.
11. PROVIDE (N) CONDUIT PASSTHROUGHS ON EAST AND WEST WALLS OF (N) OPTICS LAB.
12. PROVIDE (N) WALL MOUNTED GENERAL AND SPECIAL PURPOSE RECEPTACLES AS SHOWN ON PLANS, NOTE THAT SOME RECEPTACLES MARKED WITH IG REQUIRE AN ISOLATED GROUND.
13. PROVIDE (N) MOTOR STARTER SWITCHES FOR FFU'S.
14. PROVIDE (N) RACEWAYS, (N) J-BOXES, AND (N) HARDWARE FOR (N) ACCESS CONTROL SYSTEM TO (N) GOWNING ROOM AND (N) OPTICS LAB.
15. PROVIDE (N) FEEDERS AND DISCONNECTING MEANS FOR (N) OPTICS LAB EQUIPMENT AND (N) HVAC SYSTEMS.
16. PROVIDE (N) CONDUIT, (N) J-BOXES AND (N) HARDWARE AS REQUIRED TO INSTALL (N) THERMOSTATS AND (N) PHONE JACK.
17. PROVIDE (N) CLEAN ROOM RATED LIGHT FIXTURES, (N) EXIT SIGN AND (N) CONTROL SYSTEMS FOR THE (N) GOWNING ROOM AND OPTICS LAB.
18. EXTEND (E) RACEWAY STUB-DOWNS FROM (E) PANDECK FOR (E) CATEGORY CABLES BY PROVIDING (N) RACEWAYS AND (N) HARDWARE AS REQUIRED TO CONNECT TO (E) REINSTALLED AND (N) LADDER CABLE TRAY INSIDE THE OPTICS LAB.
19. PROVIDE (N) BRANCH CIRCUITS, CONDUIT, AND RECEPTACLES TO SUPPORT (N) SEAHAWK WATER LEAK DETECTION SYSTEM.

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F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

SYMBOLS, NOTES AND ABBREVIATIONS LISTED ARE FOR GENERAL USE. DISREGARD THOSE WHICH ARE NOT USED ON THE DRAWINGS.

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SLAC BUILDING INSPECTION OFFICE
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BY: cnadler
DATE: 5/31/2026 PRS#: 26-118
Revised Authorization ☑ No ☐ Yes
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REGISTERED PROFESSIONAL ENGINEER SERGEY V. KOROLEV E20491 EXP: 09/30/27 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E0.01

SLAC NATIONAL ACCELERATOR LABORATORY | U.S. DEPARTMENT OF ENERGY

B999
OPTICS LAB DESIGN
ELECTRICAL
COVER SHEET

THE DRAWINGS, SPECIFICATIONS AND OTHER DATA HEREIN PROVIDED SHALL NOT BE COPIED, PUBLISHED OR OTHERWISE FURTHER DISSEMINATED WITHOUT PRIOR WRITTEN PERMISSION OF STANFORD UNIVERSITY / SLAC.

		DATE	APPROVALS	DATE
ENGR	KOROLEV, SERGEY	05-18-2026	ZACHARIAH, CIBIL	05-18-2026
DES	FERNANDEZ, HUGO	05-18-2026		
CHKR	ORTIZ, JUSTIN	05-18-2026		

DRAWING NUMBER: B0999-E00-0133 REVISION: F E

DRAFT

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(N) FEEDER SCHEDULE

TAG	RATED AMPS	UNGROUNDED CONDUCTOR (AWG)	UNGROUNDED CONDUCTOR QTY. IN EA. CONDUIT	GROUNDED CONDUCTOR (AWG)	GROUNDED CONDUCTOR QTY. IN EA. CONDUIT	GROUNDING CONDUCTOR (AWG)	GROUNDING CONDUCTOR QTY. IN EA. CONDUIT	INSULATION TYPE	INSULATION RATING (DEG. C)	VOLTAGE (L-L/L-N)	PHASE	CONDUIT TRADE SIZE (DIA. INCH.)	CONDUIT TYPE	CONDUIT QTY. PER FEEDER	VERTICAL RISER/DISTANCE (LF)	HORIZONTAL DISTANCE (LF)	TOTAL DISTANCE W/ 15% ADDED (LF)	VOLTAGE DROP AT EQUIPMENT (% OF NOM.)
F001	150	#1/0	3	-	-	#6	1	THHN/THWN	75	480/-	3	1-1/2"	GALV. IMC	1	9	9	21	0.05%
F002	230	4/0	3	4/0	1	#4	1	THHN/THWN	75	208/120	3	2-1/2"	GALV. IMC	1	6	6	14	0.22%
F003	230	4/0	3	4/0	1	#4	1	THHN/THWN	75	208/120	3	2-1/2"	GALV. IMC	1	15	45	69	1.28%

NOTES:

1. ALL CONDUCTORS SHALL BE STRANDED COPPER UNLESS OTHERWISE NOTED.
2. VOLTAGE DROP CALCULATED BASED ON HORIZONTAL AND VERTICAL DISTANCES OF ROUTES SHOWN ON DRAWINGS, CHANGES IN THESE ROUTES MAY CHANGE VOLTAGE DROP, 15% SAFETY FACTOR APPLIED TO ALL DISTANCES, 85% PF IS ASSUMED.

(N) LADDER CABLE TRAY SCHEDULE

(APPROXIMATE) QUANTITY	DESCRIPTION	MANUFACTURER CATALOG NUMBER	MOUNTING TYPE	REMARKS & AREA OF USE
AS REQUIRED	EATON B-LINE SERIES 36, MATERIAL ALUMINUM, 9" RUNG SPACING, 12" WIDTH. LENGTH AVAILABLE IN 12'-0" OR 20'-0" FOR FAST DELIVERY.	36A09-12-144/ 36A09-12-240	MOUNTED ON CHANNEL STRUT BRACING.	HORIZONTAL AND VERTICAL LADDER CABLE TRAY AND UNDER LASER TABLE TRAY.
AS REQUIRED	SPLICE PLATE.	9A-1008	-	JOIN LADDER SECTIONS.
1	HORIZONTAL BEND, 90°.	6A-12-90HB-12	-	HORIZ. LADDER TURNING 90°.
2	HORIZONTAL BEND, 60°.	6A-12-60HB-12	-	HORIZ. LADDER TURNING 60°.
1	FLANGE COVER, SOLID, MATERIAL ALUMINUM, 12" WIDTH, 12'-0" LENGTH.	807A-12-120	-	COVER FOR HORIZONTAL TRANSITION PIECE AND VERTICAL RUN.
2	LADDER DROP-OUT.	9A-1104-12	-	TRANSITION TO VERTICAL TRAY.

NOTES:

1. SCHEDULE LISTS THE MAIN COMPONENTS OF LADDER CABLE TRAY SYSTEM AND ARE SHOWN FOR REFERENCE ONLY.
2. ELECTRICAL CONTRACTOR SHALL REFER TO MANUFACTURER'S CATALOG AND INSTALLATION MANUAL FOR COMPLETE LIST OF PART NUMBERS AND NECESSARY ACCESSORIES. FOLLOW PROPER MOUNTING PER MANUFACTURER'S INSTALLATION REQUIREMENTS.

(N) ELECTRICAL EQUIPMENT SCHEDULE

TAG	(APPROXIMATE) QUANTITY	DESCRIPTION	MANUFACTURER CATALOG NUMBER	VOLTAGE (L-L/L-N)	PHASE	FRAME RATING (AMPS)	LUG CONDUCTOR RANGE, PER PHASE (AWG)	DIMENSIONS (EA. UNIT) H" x W" x D"	MOUNTING TYPE	APPROXIMATE WEIGHT (LBS.)	REMARKS & AREA OF USE
PNL 1	1	SIEMENS PANELBOARD P1 TYPE, 54 CKTS, SYSTEM VOLTAGE 208/120VAC, 3-PH, 4 WIRE, #6 -350 KCMIL LUGS, 250A RATED BUS MIN., TOP FEED. COMPLETE ORDER W/ 225A MAIN BREAKER, LUG KIT, GROUND BAR AND ALL REQUIRED HARDWARE. UL LISTED, WARRANTY (12) MONTHS FROM INITIAL OPERATION AND (18) MONTHS FROM SHIPMENT.	SIEMENS: P1C54MC250ATST W/ MLKC3A (LUG KIT) W/ EGK (GND BUS)	208/120	3	250	#6AWG-350 KCMIL	44" X 20" X 5.75"	50" X 20" X 5.75"	155	(N) 208/120V PANEL "B999-2PB-1001".
T 1	1	E-SAVER OPAL-R SERIES, 75KVA XFMR., 480 DELTA TO 208/120 WYE VAC, 60HZ, K-7 RATED, FLOOR MOUNTED NEMA CLASS AA DRY TRANSFORMER RATED FOR MULTIPLE SECONDARY CONNECTIONS. COMPLETE ORDER WITH: THERMAL SWITCH KIT, 115° C TEMP RISE, CUSTOM COLOR LIGHT GREY, ROTATING IR-TRANSPARENT PORT, AND SEISMIC BRACING OPTIONS. INSTALL WITH FLOOR ISOLATOR PER SLAC MOUNTING INSTRUCTIONS (4 PADS UNDER FEET, RIGID BASE ANCHORING). UL LISTED, (32) YEAR PRO-RATED WARRANTY.	POWERSMITHS: E-SAVER-81R-75-480-208	480 PRI 208/120 SEC	3	-	AS REQUIRED AT PRIMARY AND SECONDARY TERMINALS	40.0" X 31.5" X 21.5"	FLOOR	610-700	STEP-DOWN TRANSFORMER "B999-4TX-1001".
DS 1	1	SAFETY DISCONNECT SWITCH. 30A, 3P, 600VAC. UL LISTED, 1-YR WARRANTY.	SIEMENS: HNF361	208/120	3	30	#10 AWG	15.45" X 7.67" X 10.17"	SURFACE	12	FUTURE VACUUM PUMP.
ECB 1	1	ENCLOSED CIRCUIT BREAKER ENCLOSURE, NEMA 1 W/ 3-POLE, 225A, 208V, 22kAIC MINIMUM, LSIG CIRCUIT BREAKER. UL LISTED. 1-YR WARRANTY.	EATON: SPD2K0225	208/120	3	225	-	23.8" X 9" X 9"	SURFACE	14.3	XFMR SECONDARY PROTECTION. ENCLOSED BREAKER B999-2BD-1001.
PLG 1	3	PLUG-IN OUTLET UNITS. (12) OUTLETS W/ T-SLOT. LENGTH 77". CORD 6' WITH TWIST LOCK PLUG L5-20P. UNIT WITH 20A RESETTABLE CIRCUIT BREAKER. UL LISTED, 2-YR WARRANTY.	LEGRAND: 7712ULBC20R-TL	-/120	1	20	-	77" X 1.5" X 1.5"	SURFACE	5.6	PLUG STRIPS UNDER LASER TABLE.
PLG 2	1	PLUG-IN OUTLET UNITS. (10) OUTLETS W/ T-SLOT. LENGTH 48". CORD 6' WITH TWIST LOCK PLUG L5-20P. UNIT WITH 20A RESETTABLE CIRCUIT BREAKER. UL LISTED, 2-YR WARRANTY.	LEGRAND: 4810ULBC20R-TL	-/120	1	20	-	48" X 1.5" X 1.5"	SURFACE	4.6	PLUG STRIPS UNDER LASER TABLE.
PLG 3	1	PLUG-IN OUTLET UNITS. (08) OUTLETS W/ T-SLOT. LENGTH 20". CORD 15' WITH TWIST LOCK PLUG L5-20P. UNIT WITH 20A RESETTABLE CIRCUIT BREAKER. UL LISTED, 2-YR WARRANTY.	LEGRAND: 2008ULBD20R-TL	-/120	1	20	-	20" X 1.5" X 1.5"	SURFACE	3.6	PLUG STRIPS UNDER LASER TABLE.

NOTES:

1. INSTALL (N) EQUIPMENT LISTED IN THIS SCHEDULE COMPLETE W/ALL REQUIRED HARDWARE.
2. INSTALL (N) EQUIPMENT PER MANUFACTURER'S INSTRUCTION UNLESS OTHERWISE NOTED.
3. STRUCTURAL CALCULATIONS ARE NOT REQUIRED PER ASCE 7-16 CHAPTER 13, AND PER SLAC SEISMIC DESIGN SPECIFICATION FOR BUILDINGS, STRUCTURES, EQUIPMENT, AND SYSTEMS – 2023 EDITION – SECTION 1.3.

(N) LIGHTING FIXTURE SCHEDULE

TAG	SYMBOL	(APPROXIMATE) QUANTITY	DESCRIPTION	MANUFACTURER CATALOG NUMBER	VOLTAGE	NOMINAL LUMEN OUTPUT	WATTS	LM/ WATT	MOUNTING TYPE	APPROXIMATE WEIGHT (LBS.)	REMARKS & AREA OF USE
A		7	2' X 2' RECESSED INTO 1" SUSPENDED T-BAR CEILING, 90 CRI, 4000K, UL LISTED, 5 YEAR WARRANTY, DIE-FORMED 20-GAUGE COLD-ROLLED STEEL HOUSING, 0-10V DIMMING DRIVER, STANDARD OUTPUT.	KENALL: CSERI-22-60L-40K9-DIM1-DV-2F-4H -SYMW	120	7593	67.0	109.0	RECESSED INTO 1" T-BAR	22.85	OPTICS LAB ROOM.
AE		4	THE SAME AS FIXTURE "A" EXCEPT EQUIPPED WITH UL924 COMPLIANT DRIVER, RELAY AND BATTERY W/ 90 MINUTE CAPACITY.	KENALL: CSERI-22-60L-40K9-DIM1-DV-2F-4H -SYMW-LEL	120	7593 EM-994	67.0	109.0	RECESSED INTO 1' T-BAR	26 - 28	OPTICS LAB ROOM AND GOWNING ROOM. LIGHTING EQUIPPED WITH EMERGENCY DRIVER AND BACK-UP BATTERY FOR EMERGENCY EGRESS ILLUMINATION.
XE		1	LED EDGE LIT EXIT SIGN, GREEN LETTERS ON MIRROR BACK PLATE, UL924 COMPLIANT 6" HIGH LETTERS W/ 3/4" STROKE, 100 FT. VIEWING RATING BASED ON UL924. "EL" SELF-DIAGNOSTIC TESTING WITH ON DEMAND VISUAL INSPECTION TEST SWITCH, EQUIPPED WITH 90 MINUTE BACK-UP BATTERY, 3 YEAR WARRANTY, UNIVERSAL SURFACE MOUNT. FIELD INSTALL CHEVRONS.	CHLORIDE: ER44RLDU1GM	120	-	3	-	END, TOP OR BACK MOUNTED TO WALL OR CEILING	2.6	GREEN LETTERS ON MIRROR BACKGROUND. USED ALONG PATH OF EGRESS TO EXTERIOR EXITS.

NOTES:

1. ALL LIGHTING FIXTURES SHALL BE OF LED SOURCE TYPE.
2. STRUCTURAL CALCULATIONS ARE NOT REQUIRED PER ASCE 7-16 CHAPTER 13, AND PER SLAC SEISMIC DESIGN SPECIFICATION FOR BUILDINGS, STRUCTURES, EQUIPMENT, AND SYSTEMS – 2023 EDITION – SECTION 1.3.
3. ALL FIXTURES SHALL BE RATED FOR RECEIVING POWER FROM 120VAC BRANCH CIRCUITS, U.O.N.
4. MOUNT FIXTURES ACCORDING TO MANUFACTURER'S REQUIREMENT AND PROVIDE MOUNTING ACCESSORIES PER MANUFACTURER'S STANDARDS.

(N) LIGHTING AND CONTROL DEVICES SCHEDULE

SYMBOL	(APPROXIMATE) QUANTITY	DESCRIPTION	MANUFACTURER CATALOG NUMBER	INPUT VOLTAGE (VAC)	MOUNTING TYPE	REMARKS & AREA OF USE
RC-X	2	WATTSTOPPER DLM ON/OFF/0-10V DIMMING ROOM CONTROLLER, 2-RELAY, 2-ZONE, 120/230/240/277VAC, EA. RELAY RATED 20A OR 1HP. RC-X, "X" DENOTES ROOM CONTROLLER IN SEQUENCE PER ZONE, UL LISTED, 5-YR. WARRANTY.	LMRC-212	120VAC	MOUNTED INSIDE (N) J-BOX AT CEILING.	OPTICS LAB AND GOWNING ROOM ON/OFF AND DIMMING CONTROL.
$D/x	2	WATTSTOPPER DLM DIMMING SWITCH, CONNECTION VIA CAT6 CABLE AND RJ45 CONNECTOR TO ROOM CONTROLLER OR OTHER CONTROL DEVICE, UL LISTED, 5-YR. WARRANTY. "X" DENOTES SWITCH TAG.	LMSW-211-W	5VDC	MOUNTED TO (N) J-BOX AT ENTRANCE TO ROOM.	OPTICS LAB AND GOWNING ROOM ON/OFF AND DIMMING SWITCH.
$M	7	LEVITON MOTOR STARTER SWITCH W/ENCLOSURE, LOCKABLE. 2 POLES 1-PHASE, 30A MAX. UL LISTED, 10-YR LIMITED WARRANTY. COMPLETE WITH LOCKOUT BRACKET "LKOUT-40" IF BRACKET IS NOT PART OF THE ASSEMBLY.	N1302-DS	120VAC	SURFACE MOUNTED IN VESTIBULE ROOM	FFU ON/OFF SWITCH.

NOTES:

1. ELECTRICAL CONTRACTOR SHALL PROGRAM AND CONFIGURE THE LIGHTING CONTROL SYSTEM TO BE PER SEQUENCE OF OPERATION SPECIFIED AND THE FINISHED INSTALLATION SHALL MEET OR EXCEED TITLE 24 REQUIREMENTS.
2. ELECTRICAL CONTRACTOR SHALL REFER TO TYPICAL WIRING DIAGRAMS AND PROVIDE REQUIRED CABLING SHOWN. FOLLOW PROPER WIRING TERMINATION PER MANUFACTURER'S INSTALLATION REQUIREMENTS.
3. ELECTRICAL CONTRACTOR SHALL PROVIDE ADDITIONAL LIGHTING CONTROL COMPONENTS, CABLING AND/OR HARDWARE TO CONSTRUCT AND COMMISSION A COMPLETE AND FUNCTIONING LIGHTING CONTROL SYSTEM.
4. ELECTRICAL CONTRACTOR SHALL INSTALL LIGHTING CONTROL DEVICES ACCORDING TO MANUFACTURER'S REQUIREMENT AND ENVIRONMENT CONDITIONS BASED ON DEVICE LOCATION AND INTENDED USE SHOWN ON RESPECTIVE DRAWINGS.
5. REFER TO THIS SHEET AND E2.01 FOR ADDITIONAL COMPONENTS AND DIAGRAMS AS REQUIRED TO PROVIDE A COMPLETE AND FULLY FUNCTIONING LIGHTING CONTROL SYSTEM.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE AND SCHEDULE A 1-DAY SITE VISIT WITH EEOR AT LEAST 2-WEEKS IN ADVANCE TO DEMONSTRATE COMPLIANCE OF THE LIGHTING CONTROL SYSTEM FUNCTIONALITY WITH SEQUENCE OF OPERATION UNDER NORMAL CONDITIONS, AND WITH CALIFORNIA ENERGY AND EMERGENCY EGRESS REQUIREMENTS. THE ELECTRICAL CONTRACTOR SHALL COORDINATE AND SCHEDULE ADDITIONAL SITE VISITS UNTIL THE EEOR DEEMS THE LIGHTING CONTROL SYSTEM TO BE IN AN ACCEPTABLE STATE AND READY FOR THIRD PARTY COMMISSIONING.
7. INTERCONNECT (N) ROOM CONTROLLER TO (N) LIGHT FIXTURES USING 2-#14 DIMMING CONDUCTORS.

CODE COMPLIANCE AND COMMISSIONING:

AS REQUIRED PRIOR TO APPLYING FOR SUBSTANTIAL COMPLETION; ALL APPLICABLE REQUIREMENTS, TESTING, DOCUMENTATION AND RECORD OF CONFORMANCE SHALL BE SUBMITTED IN ACCORDANCE WITH CALIFORNIA ENERGY CODE 10-103(A); INCLUDING, BUT NOT LIMITED TO, THE INSTALLATION CERTIFICATE FOR THE LIGHTING CONTROL SYSTEM AS PER CALIFORNIA ENERGY CODE SECTION 130.4(B).

BEFORE AN OCCUPANCY PERMIT IS GRANTED, INDOOR AND OUTDOOR LIGHTING CONTROLS SERVING THE BUILDING SHALL BE CERTIFIED AS MEETING THE ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE IN ACCORDANCE WITH CALIFORNIA ENERGY CODE SECTION 130.4(A).

THE CERTIFICATE OF COMPLIANCE FORMS FOUND AS PART OF THIS SET ON RESPECTIVE ENERGY COMPLIANCE DRAWINGS SHALL BE SIGNED BY THE ELECTRICAL ENGINEER FOR THE DESIGN, THE ELECTRICAL CONTRACTOR FOR THE INSTALLATION, AND THE COMMISSIONING PARTY FOR COMPLIANCE.

LIGHTING TYPICAL SEQUENCE OF OPERATIONS:

GENERAL LIGHTING INTERIOR AREAS:

- ALL INTERIOR LIGHTING CIRCUITS TURN ON BASED ON USER OPERATION OF MANUAL ON/OFF AND DIMMING SWITCH AT ENTRIES INTO THE AREA FOR EACH ZONE.
- FULL RANGE DIMMING VIA DIMMING SWITCH.
- ALL INTERIOR LIGHTING CIRCUITS TURN OFF BASED ON USER OPERATION OF MANUAL ON/OFF AND DIMMING SWITCH AT ENTRIES INTO THE AREA FOR EACH ZONE.

DRAFT

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SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E0.02

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DES FERNANDEZ, HUGO 05-18-2026
CHKR ORTIZ, JUSTIN 05-18-2026
APPROVALS ZACHARIAH, OBIL 05-18-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
EQUIPMENT AND LIGHTING SCHEDULES

DRAWING NUMBER: B0999-E06-0134 | REVISION: F | E

B0999-E06-0134 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
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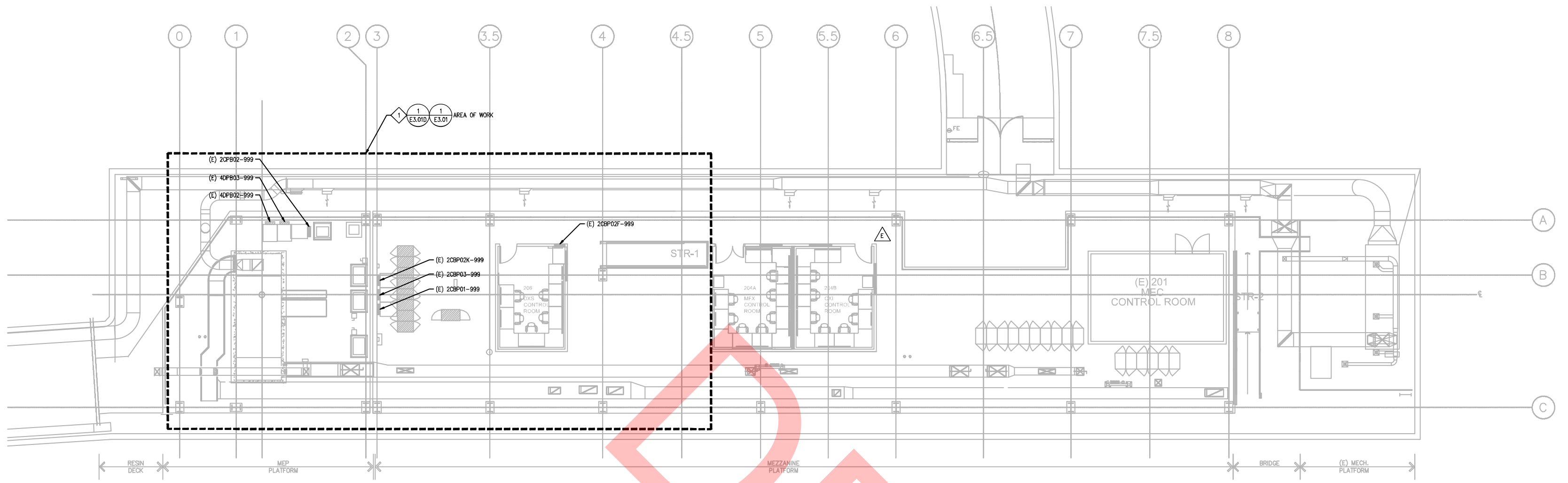
PLAN GENERAL NOTES

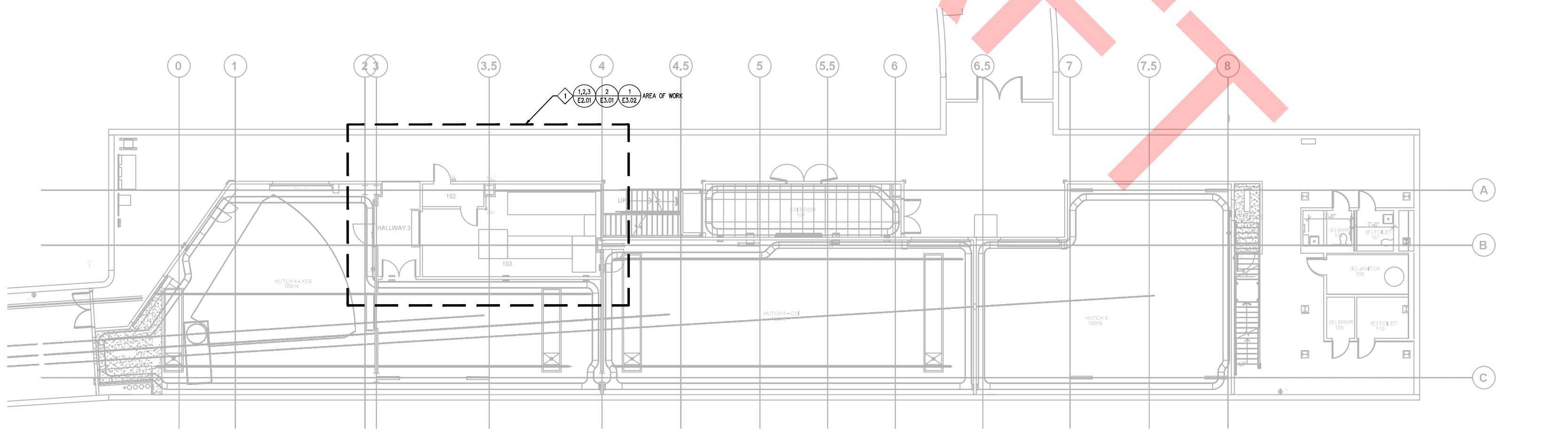
1. INFORMATION PROVIDED ON THESE CONSTRUCTION DOCUMENTS WAS GATHERED FROM FIELD OBSERVATION AND PREVIOUS RECORD DRAWINGS AND SHALL BE USED WITH CAUTION; CONTRACTOR SHALL FIELD VERIFY ALL QUANTITIES, ESPECIALLY THE EXACT COUNT OF DEVICES, ROUTING, SIZES, LENGTHS AND COUNTS OF CONDUIT AND CONDUCTORS TO BE INSTALLED AND OR REMOVED PRIOR TO STARTING THE RESPECTIVE WORK.
2. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE ELECTRICAL COVER SHEET.
3. WORK SHALL NOT INTERFERE WITH ADJACENT FACILITY USE AND OR FUNCTION. CONTRACTOR SHALL COORDINATE WITH SLAC OWNER REPRESENTATIVE AT LEAST 2-WEEKS PRIOR TO STARTING WORK TO ESTABLISH A MUTUALLY AGREED UPON SCHEDULE.
4. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES.
5. CONTRACTOR SHALL MAINTAIN AND VERIFY CONTINUITY OF UPSTREAM AND DOWNSTREAM ELECTRICAL CIRCUITS DURING AND AFTER WORK IS COMPLETE.
6. CONTRACTOR SHALL FOLLOW MANUFACTURER'S MOUNTING, WIRING AND INSTALLATION INSTRUCTIONS FOR ALL ASSEMBLIES AND DEVICES UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL COORDINATE ALL ROUTING OF CONDUIT AND WIRING WITH (E) CONDITIONS.
8. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF RECEPT. W/ SLAC OWNER REPRESENTATIVE.
9. IF REQUIRED BY SLAC OWNER REPRESENTATIVE CONTRACTOR SHALL PAINT (N) CONDUIT IN ACCORDANCE W/ APPLICABLE PROCEDURES.
10. ELECTRICAL CIRCUITS AND EQUIPMENT THAT ARE SHOWN IN LIGHTER LINE WEIGHT OR IN GRAY COLOR ARE EXISTING.
11. SEE EQUIPMENT SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE EQUIPMENT TAGS.
12. SEE FEEDER SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE FEEDER TAGS.
13. NEUTRAL CONDUCTOR FOR SINGLE PHASE LOADS SHALL USE TRACER COLOR TO MATCH PHASE CONDUCTOR COLOR.
14. SEE PANEL SCHEDULE FOR DESCRIPTION OF SPECIAL PURPOSE RECEPTACLE NEMA TYPE.
15. ALL EQUIPMENT, CONDUIT, AND WIRES NOT IN CONDUIT SHALL BE PLENUM-RATED ABOVE CEILING.
16. CONTRACTOR SHALL PROVIDE #4 NYLON PULL STRINGS IN ALL EMPTY CONDUITS.

PLAN KEY NOTES

1. SEE RESPECTIVE SHEET AND DETAIL FOR THE CORRESPONDING SCOPE OF WORK IN B999.



1 SITE PLAN – MEZZANINE LEVEL SCALE : 1/8" = 1'-0"



2 SITE PLAN – TUNNEL LEVEL SCALE : 1/8" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (IFC)
BY: cnadler
DATE: 5/31/2026
PRS#: 26-18
Revised Authorization ☑ No ☐ Yes
These plans have been reviewed for compliance with applicable building codes and standards, and ESH program requirements.
The authorization of these plans shall not be construed to be a permit, or an approval for violation of any applicable codes, standards, or ESH programs.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

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REGISTERED PROFESSIONAL ENGINEER SERGEY V. KOROLEV E20491 EXP:09/30/27 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E1.01

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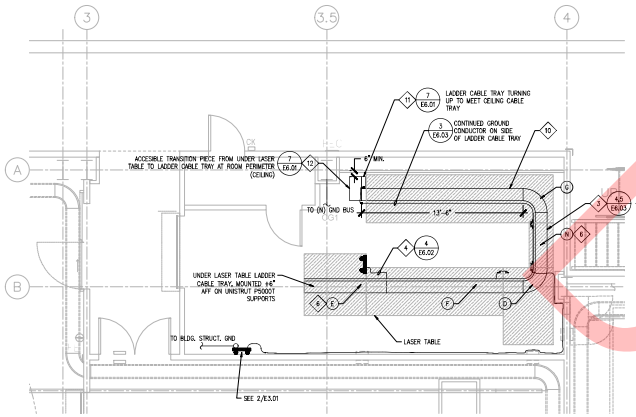
		DATE	APPROVALS	DATE
ENGR	KOROLEV, SERGEY	05-18-2026	ZACHARIAH, CBIL	05-18-2026
DES	FERNANDEZ, HUGO	05-18-2026		
CHKR	ORTIZ, JUSTIN	05-18-2026		

B999
OPTICS LAB DESIGN
ELECTRICAL
SITE PLAN

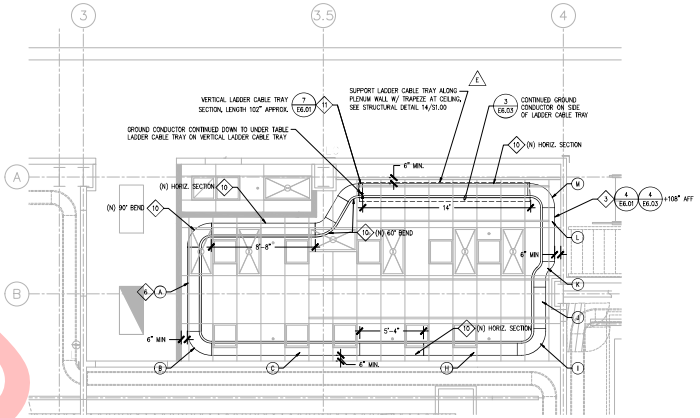
DRAWING NUMBER B0999-ES1-0135 | REVISION F | E

B0999-ES1-0135 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026



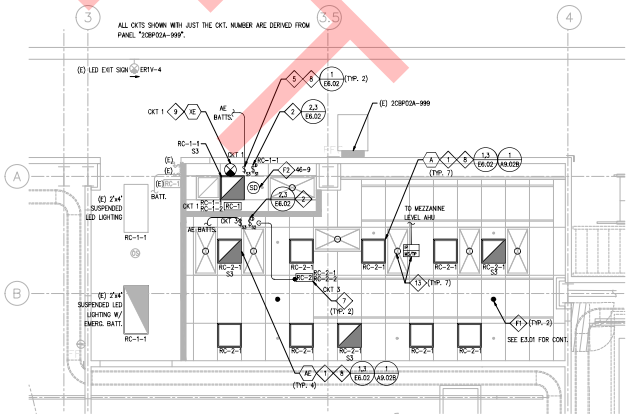
3 LADDER CABLE TRAY PLAN
UNDER LASER TABLES
SCALE : 1/4" = 1'-0"



1 LADDER CABLE TRAY PLAN
CEILING LEVEL
SCALE : 1/4" = 1'-0"

OCC. SENSORS FUNCTION FOR LIGHTING MAY DAMAGE SENSITIVE LASER EQUIPMENT OR NEGATIVELY IMPACT EQUIPMENT CALIBRATION.

TO ACHIEVE ENERGY COMPLIANCE WITH CCR, TITLE 24, PART 6, SECTION 130.1 – MANDATORY INDOOR LIGHTING CONTROLS, EXCEPTION 2 FOR SECTION 130.1(C)1 WAS CLAIMED, ROOM USE IS 24/365 TO NOT REQUIRE OCC. SENSORS.



2 LIGHTING PLAN
SCALE : 1/4" = 1'-0"

PLAN GENERAL NOTES

1. INFORMATION PROVIDED ON THESE CONSTRUCTION DOCUMENTS WAS GATHERED FROM FIELD OBSERVATION AND PREVIOUS RECORD DRAWINGS AND SHALL BE USED WITH CAUTION. CONTRACTOR SHALL FIELD VERIFY ALL QUANTITIES, ESPECIALLY THE EXACT COUNT OF DEVICES, ROUTING, SIZES, LENGTHS AND COUNTS OF CONDUIT AND CONDUCTORS TO BE INSTALLED AND OR REMOVED PRIOR TO STARTING THE RESPECTIVE WORK.
2. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE ELECTRICAL COVER SHEET.
3. WORK SHALL NOT INTERFERE WITH ADJACENT FACILITY USE AND OR FUNCTION. CONTRACTOR SHALL COORDINATE WITH SLAC OWNER REPRESENTATIVE AT LEAST 2–WEEKS PRIOR TO STARTING WORK TO ESTABLISH A MUTUALLY AGREED UPON SCHEDULE.
4. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES.
5. CONTRACTOR SHALL MAINTAIN AND VERIFY CONTINUITY OF UPSTREAM AND DOWNSTREAM ELECTRICAL CIRCUITS DURING AND AFTER WORK IS COMPLETE.
6. CONTRACTOR SHALL FOLLOW MANUFACTURER'S MOUNTING, WIRING AND INSTALLATION INSTRUCTIONS FOR ALL ASSEMBLIES AND DEVICES UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL COORDINATE ALL ROUTING OF CONDUIT AND WIRING WITH (E) CONDITIONS.
8. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF RECEPT. W/ SLAC OWNER REPRESENTATIVE.
9. IF REQUIRED BY SLAC OWNER REPRESENTATIVE CONTRACTOR SHALL PAINT (N) CONDUIT IN ACCORDANCE W/ APPLICABLE PROCEDURES.
10. ELECTRICAL CIRCUITS AND EQUIPMENT THAT ARE SHOWN IN LIGHTER LINE WEIGHT OR IN GRAY COLOR ARE EXISTING.
11. SEE EQUIPMENT SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE EQUIPMENT TAGS.
12. SEE FEEDER SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE FEEDER TAGS.
13. NEUTRAL CONDUCTOR FOR SINGLE PHASE LOADS SHALL USE TRACER COLOR TO MATCH PHASE CONDUCTOR COLOR.
14. SEE PANEL SCHEDULE FOR DESCRIPTION OF SPECIAL PURPOSE RECEPTACLE NEMA TYPE.
15. ALL EQUIPMENT, CONDUIT, AND WIRES NOT IN CONDUIT SHALL BE PLENUM–RATED ABOVE CEILING.
16. CONTRACTOR SHALL PROVIDE #4 NYLON PULL STRINGS IN ALL EMPTY CONDUITS.

PLAN KEY NOTES

1. PROVIDE (N) LIGHT FIXTURE, (N) BRANCH CIRCUIT AND (N) SEPARATED DIMMING CIRCUIT TO SPECIFIED ROOM CONTROLLER RELAY. USE 3/4" EMT W/2#12AWG + #10G FOR POWER AND 3/4" EMT W/ 2#14AWG FOR DIMMING.
2. PROVIDE (N) FLUSH MOUNTED DIMMING SWITCH AND (N) INTERCONNECTION TO UPSTREAM DLM DEVICE, USE 3/4" EMT W/ CAT6.
3. CLEAN AND INSTALL RETAINED (E) 12" X 6" LADDER CABLE TRAY SECTIONS. COMPLETE W/ (N) SECTIONS OR ACCESSORIES WHERE NECESSARY. CONTRACTOR TO COORDINATE FINAL LAYOUT W/ SLAC OWNER REPRESENTATIVE.
4. PROVIDE (N) LASER TABLE GND. SYSTEM.
5. PROVIDE (N) 120VAC 20A RATED RED COLORED TOGGLE ON/OFF SWITCH W/ RED COLORED FACEPLATE, W/ CLEAR PLASTIC COVER TO ENABLE TESTING OF FIXTURES "AC" FROM FLOOR LEVEL.
6. CUT RETAINED (E) LADDER CABLE TRAY SEGMENT TO LENGTH AS NEEDED.
7. PROVIDE (N) ROOM CONTROLLER IN (N) 10"H X 10"W X 6"D PULL BOX ABOVE CEILING. PROVIDE (N) BRANCH CIRCUIT, USE 3/4" EMT W/ 2#12AWG + #10G FOR POWER AND 3/4" EMT W/ 2#14AWG FOR DIMMING. INCOMING (N) CAT6 THROUGH BOX.
8. PROVIDE (N) INTERCONNECTION TO NORMAL POWER SENSE LEG OF (N) BATT. CONTROLLER. USE 3/4" EMT W/ 2#12AWG + #10G TO INTERCONNECT (N) SWITCH TO (N) BATT. CONTROLLER.
9. PROVIDE (N) EXIT SIGN W/ (N) UNSWITCHED BRANCH CKT EXTENSION, USE 3/4" EMT W/ 2#12AWG + #10G.
10. PROVIDE (N) EATON B–LINE HORIZONTAL 12" X 6" STRAIGHT SECTION OF LADDER CABLE TRAY, 90° AND 60° HORIZONTAL BENDS. COMPLETE W/ REQUIRED ACCESSORIES. SEE LADDER CABLE TRAY SCHEDULE.
11. PROVIDE (N) VERTICAL 12" X 6" STRAIGHT LADDER CABLE TRAY SECTION, AND (N) COVER FOR VERTICAL RUN. COMPLETE W/ REQUIRED ACCESSORIES. SEE LADDER CABLE TRAY SCHEDULE. EXTEND EQC CONDUCTOR FROM CEILING LADDER CABLE TRAY TO MEET EQC CONDUCTOR A FLOOR LEVEL.
12. PROVIDE (N) EATON B–LINE HORIZONTAL 12" X 6" STRAIGHT SECTION OF LADDER CABLE TRAY W/ COVER, W/ ADJUSTABLE SPLICE PLATES. COMPLETE W/ REQUIRED ACCESSORIES. SEE LADDER CABLE TRAY SCHEDULE.
13. PROVIDE (N) BACNET MS/TP TO IP ROUTER IN 12"W x 12"H x 6"D NEMA 12 ENCLOSURE ABOVE SUSPENDED CEILING, AND DAISY CHAIN (N) FTU CONTROLLERS USING 3/4" EMT W/ STP CABLE. PROVIDE (N) 3/4" EMT W/ CAT6 CABLE TO UPSTREAM ALC DEVICE. COORDINATE W/ SLAC OWNER REPRESENTATIVE FOR FINAL ROUTING, AND COORDINATE W/ SLAC IT AND IAC FOR TERMINATION AND INTERCONNECTION TO BUILDING ALC NETWORK.

FIRE ALARM PLAN KEY NOTES

F1. PROVIDE (N) VESDA SAMPLING PORT FLUSH W/ (N) SUSPENDED CEILING, AND PROVIDE (N) VESDA SAMPLING TUBE TO (E) VESDA SYSTEM IN HALLWAY. COORDINATE INSTALLATION W/ SLAC OWNER REPRESENTATIVE AND FIRE TECHNICIANS.

F2. INSTALL RETAINED (E) SMOKE DETECTOR AT CEILING AND PROVIDE (N) EOL EXTENSION FROM (E) J–BOX ABOVE (N) SUSPENDED CEILING IN OPTICS LAB, USE 3/4" EMT W/ FPL CABLE, MATCH EXISTING WIRE GAUGE. CONDUIT AND J–BOX COVERS SHALL BE RED.

DRAFT

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC National Accelerator Laboratory
Construction Authorization (ATC)
BY: <name>
DATE: 10/1/2026 FROM: Dir-16
Revised Authorization ☐ No ☐ Yes
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REGISTERED PROFESSIONAL ENGINEER STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E2.01

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		DATE
ENGR	KOCUN, SERGEY	05-01-2026
DES	FERNANDEZ, HUGO	04-24-2026
CHKR	ORTIZ, JUSTIN	05-1-2026

APPROVALS — DATE
DAGHIGHIAN, ISAAC — 05-1-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
RCP AND CABLE TRAY PLAN

DRAWING NUMBER: B0999-EL1-0136 | REVISION: F | E

B0999-EL1-0136 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

PHOTOMETRY GENERAL NOTES

1. PHOTOMETRY CALCULATIONS HAVE BEEN PERFORMED ACCORDING TO IES STANDARDS AND GOOD PRACTICE. SOME DIFFERENCES BETWEEN MEASURED VALUES AND CALCULATED RESULTS MAY OCCUR DUE TO MEASUREMENT TECHNIQUES, VARIANCE FROM SIMULATION PARAMETERS TO ACTUAL CONDITIONS. SIMULATION PARAMETERS USED TO GENERATE THE ATTACHED CALCULATIONS INCLUDING, BUT NOT LIMITED TO, ROOM DIMENSIONS, VOLTAGE, TEMPERATURE, REFLECTANCE AND OTHER SURFACE PROPERTIES, PUBLISHED LAMP RATINGS AND PERFORMANCE CHARACTERISTICS OF THE LIGHT FIXTURES, FURNITURE AND ARCHITECTURAL ELEMENTS SIGNIFICANTLY AFFECT PHOTOMETRY.
2. IES FILES USED IN THE PHOTOMETRY CALCULATIONS WERE PROVIDED BY RESPECTIVE LIGHTING FIXTURE MANUFACTURER LISTED IN LUMINAIRE SCHEDULE.
3. ALL AREA ILLUMINANCE VALUES ARE MAINTAINED FOOT CANDLES AT THE FINISHED GRADE LEVEL, U.O.N.
4. GENERAL MIN/MAX RATIO TARGET OF +/- 10 FC MAX.
5. LIGHT LOSS FACTOR (LLF) USED REPRESENTS LIGHTING FIXTURES AFTER YEARS IN SERVICE APPROACHING L70, I.E. LLD = 0.944, LDD = 0.900, RF = 1.032, AND LBF = 0.900.

DRAFT

LUMINAIRE SCHEDULE:

TAG	QUANITY	DESCRIPTION	LLF	EFFECTIVE LUMENS	LUMINAIRE WATTS (NOMINAL)	TOTAL WATTS (NOMINAL)
A	7	CSER-22-60L-40K9-DWH-DV-2F-4H-SWW	0.789	5990	67	469
AE	4	CSER-22-60L-40K9-DWH-DV-2F-4H-SWW-LEL	0.789	5990	67	268

1 PHOTOMETRICS
OPTICS LAB AND GOWNING ROOM
SCALE : 1/4" = 1'-0"

NORTH

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit plan comply

Construction Authorization (AFC)

BY: mm/dd/yy

DATE: 10/1/2020 FROM: Dan Ge

Revised Authorization ☐ No ☐ Yes

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REGISTERED PROFESSIONAL ENGINEER STACEY V. FOSTER No. E20648 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | EP2.01

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ENGR KOKUEV, BORIS Date 05-18-2026
DES FERNANDEZ, HUGO Date 05-18-2026
CHKR ORTIZ, JUSTIN Date 05-18-2026
APPROVALS ZACHARIAH, SUE Date 05-19-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
PHOTOMETRICS

DRAWING NUMBER B0999-EL1-0137 | REVISION F | E

B0999-EL1-0137 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

PHOTOMETRY GENERAL NOTES

1. PHOTOMETRY CALCULATIONS HAVE BEEN PERFORMED ACCORDING TO IES STANDARDS AND GOOD PRACTICE. SOME DIFFERENCES BETWEEN MEASURED VALUES AND CALCULATED RESULTS MAY OCCUR DUE TO MEASUREMENT TECHNIQUES, VARIANCE FROM SIMULATION PARAMETERS TO ACTUAL CONDITIONS. SIMULATION PARAMETERS USED TO GENERATE THE ATTACHED CALCULATIONS INCLUDING, BUT NOT LIMITED TO, ROOM DIMENSIONS, VOLTAGE, TEMPERATURE, REFLECTANCE AND OTHER SURFACE PROPERTIES, PUBLISHED LAMP RATINGS AND PERFORMANCE CHARACTERISTICS OF THE LIGHT FIXTURES, FURNITURE AND ARCHITECTURAL ELEMENTS SIGNIFICANTLY AFFECT PHOTOMETRY.
2. IES FILES USED IN THE PHOTOMETRY CALCULATIONS WERE PROVIDED BY RESPECTIVE LIGHTING FIXTURE MANUFACTURER LISTED IN LUMINAIRE SCHEDULE.
3. ALL AREA ILLUMINANCE VALUES ARE MAINTAINED FOOT CANDLES AT THE FINISHED GRADE LEVEL, U.O.N.
4. GENERAL MIN/MAX RATIO TARGET OF +/- 10 FC MAX.
5. LIGHT LOSS FACTOR (LLF) USED REPRESENTS LIGHTING FIXTURES AFTER YEARS IN SERVICE APPROACHING L70, I.E. LLD = 0.944, LDD = 0.900, BF = 1.032, AND LDF = 0.900.

DESIGN NOTES:

1. DATA SHOWN FOR OPTICS LAB AND GOWNING ROOM ONLY.
2. EMERGENCY EGRESS LIGHTING MINIMUM AND PERFORMANCE REQUIREMENTS BASED ON NFPA 101 ARTICLE 7.8.1.1, 7.8.1.3 AND 7.9.2.1, WHICH STATE:

   7.8.1.3 – THE FLOORS AND OTHER WALKING SURFACES WITHIN AN EXIT AND WITHIN PORTIONS OF THE EXIT ACCESS AND EXIT DISCHARGE DESIGNATED IN 7.8.1.1 SHALL BE ILLUMINATED TO VALUES OF AT LEAST 1 FC MEASURED AT FLOOR LEVEL.

   7.9.2.1 – EMERGENCY ILLUMINATION SHALL BE PROVIDED FOR A PERIOD OF 1.5 HOURS IN THE EVENT OF FAILURE OF NORMAL LIGHTING. EMERGENCY LIGHTING FACILITIES SHALL BE ARRANGED TO PROVIDE INITIAL ILLUMINATION THAT IS AT LEAST AN AVERAGE OF 1 FC AND A MINIMUM AT ANY POINT OF 0.1 FC MEASURED ALONG THE PATH OF EGRESS AT FLOOR LEVEL. ILLUMINATION LEVELS MAY DECLINE TO 0.6 FC AVERAGE AND A MINIMUM AT ANY POINT OF 0.06 FC AT THE END OF THE EMERGENCY ILLUMINATION LIGHTING TIME DURATION. A MAXIMUM TO MINIMUM ILLUMINATION UNIFORMITY RATIO OF 40-TO-1 SHALL NOT BE EXCEEDED.

DRAFT

LUMINAIRE SCHEDULE:

TAG	QUANTITY	DESCRIPTION	LLF	EFFECTIVE LUMENS	LUMINAIRE WATTS (NOMINAL)	TOTAL WATTS (NOMINAL)
AE	4	CSER-22-60L-40K9-DMT-2V-2F-4H-SNW-L EL	0.789	998	67	268

1 EMERGENCY EGRESS PHOTOMETRICS
OPTICS LAB AND GOWNING ROOM
SCALE : 1/4" = 1'-0"

NORTH

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC National Accelerator Laboratory
Construction Authorization (CA)
BR-number
DATE: 10/1/2026 FROM: DH-16
Revised Authorization ☒ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION & INSPECTIONS.

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REGISTERED PROFESSIONAL ENGINEER STACEY V. FOSTER 22668 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04		EPE2.01

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ENGR	DES	CHKR
KOKUEV, SERGEY	RAMIREZ, HUGO	ORTIZ, JUSTIN

APPROVALS	DATE
ZACHARIAH, SUE	05-19-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
EMERGENCY EGRESS PHOTOMETRICS

DRAWING NUMBER: B0999-EL1-0138 | REVISION: F | E

B0999-EL1-0138 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
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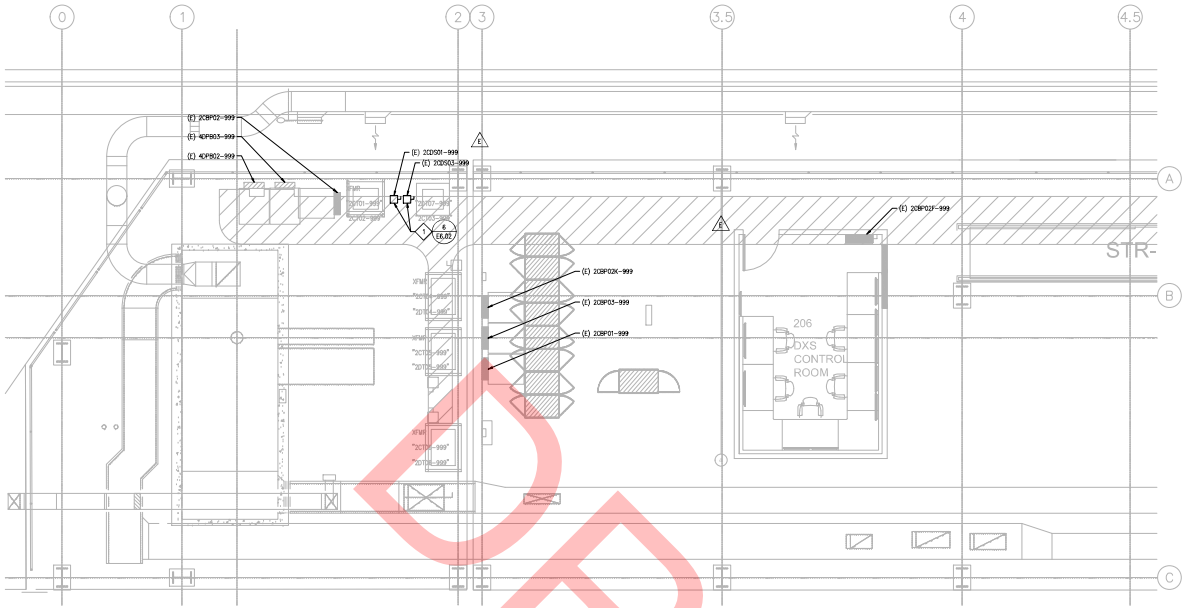

1 POWER DEMO PLAN
MEZZANINE LEVEL
SCALE : 1/4" = 1'-0"

NORTH

DRAFT

DEMOLITION GENERAL NOTES

1. THE QUANTITY AND LOCATION OF (E) ELECTRICAL DEVICES, PATHWAYS AND EQUIPMENT THAT SHALL BE REMOVED AS PART OF THIS PROJECT ARE SHOWN ON RESPECTIVE ELECTRICAL DEMOLITION DRAWINGS BASED ON OLDER AND PARTIAL AS-BUILT DRAWINGS, AND SITE OBSERVATIONS, NOT EVERYTHING COULD BE VERIFIED WITHOUT REMOVING DEAD FRONTS AND DISTURBING EQUIPMENT FUNCTION. THEREFORE, THE CONTRACTOR SHALL USE THIS INFORMATION FOR REFERENCE ONLY, AND PRIOR TO BID, SHALL VISIT THE SITE AND FURTHER OBSERVE (E) CONDITIONS AS NECESSARY TO VERIFY THE RESPECTIVE DEMOLITION DRAWINGS TO PERFORM THE DEMOLITION OF THE (E) ELECTRICAL SYSTEMS ACCORDING TO THE RESPECTIVE DEMOLITION DRAWINGS, NOTIFY E.E.O.R. OF ANY DISCREPANCIES FOUND.
2. CONTRACTOR SHALL COORDINATE AND PLAN ALL DEMOLITION WORK WITH THE SLAC OWNER REPRESENTATIVE, ALL OTHER DISCIPLINES ASSIGNED TO THIS PROJECT, AND UTILITY OR SERVICE PROVIDERS, INCLUDING, BUT NOT LIMITED TO THE ELECTRICAL PROVIDER.
3. CONTRACTOR SHALL COORDINATE ALL DEMOLITION WORK WITH REQUIREMENTS OF TECHNICAL SPECIFICATIONS FOR HAZARDOUS MATERIALS ABATEMENT REPORT PREPARED BY INDUSTRIAL HYGIENE CONSULTANT (IF REQUIRED BY SLAC OWNER REPRESENTATIVE).
4. CONTRACTOR SHALL MAINTAIN AND VERIFY CONTINUITY OF UPSTREAM AND DOWNSTREAM ELECTRICAL CIRCUITS DURING AND AFTER WORK IS COMPLETE.
5. DEMOLITION WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, SPECIFIC DEMOLITION WORK SHOWN ON THESE DEMOLITION DRAWINGS AND THE FOLLOWING:

   A. AIR GAP, DISCONNECT AND REMOVE (E) ELECTRICAL EQUIPMENT.

   B. AIR GAP, DISCONNECT AND REMOVE (E) CONDUCTORS AND RACEWAYS WHERE SPECIFIED TO DO SO.

   C. REMOVE AND DISPOSE OF ALL REMOVED CONDUITS, RACEWAYS AND WIRING FROM THE PREMISES ACCORDING TO FEDERAL AND STATE REGULATIONS.

   D. PATCH, REPAIR AND PAINT ALL SURFACES ON WALLS AND CEILINGS THAT ARE TO REMAIN, WHERE WORK HAS BEEN PERFORMED TO MATCH (E) ADJACENT CONDITIONS, AND MAINTAIN (E) FIRE RATED CONSTRUCTION.
6. ALL (E) EQUIPMENT BEING REMOVED SHALL REMAIN AS THE PROPERTY OF THE SLAC OWNER REPRESENTATIVE AND SHALL BE PREPARED FOR STORAGE BY CONTRACTOR AND RETURNED TO THE SLAC OWNER REPRESENTATIVE. CONTRACTOR SHALL COORDINATE WITH THE SLAC OWNER REPRESENTATIVE FOR STORAGE LOCATION AND METHOD, AND STORE THE EQUIPMENT AS DIRECTED.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY LIGHTING AND POWER CONNECTIONS FOR THEMSELVES AND OTHER DISCIPLINES AS REQUIRED DURING THE CONSTRUCTION EFFORT.
8. ALL (E) SURVEILLANCE, FIRE LIFE SAFETY, AND SECURITY DEVICES SHALL REMAIN AND BE PROTECTED DURING CONSTRUCTION.
9. ALL (E) ELECTRICAL WIRING, AND CONDUIT TO REMAIN, SIGNAL AND FIRE ALARM EQUIPMENT, SERVICES, AND RACEWAYS SHOWN ON THIS DEMOLITION PLAN AND ANY OTHER ADDITIONAL EQUIPMENT IDENTIFIED BY OPR, POTHOLING, OR X-RAY SCANS OR OTHERWISE DISCOVERED IN FIELD SHALL REMAIN AND BE PROTECTED DURING THE DEMOLITION EFFORT UNLESS OTHERWISE INSTRUCTED BY THE E.E.O.R. DURING CONSTRUCTION.
10. ELECTRICAL DEMOLITION SHALL COMPLY WITH THE CONSTRUCTION SAFETY REQUIREMENTS MANUAL.
11. CAP AND SEAL ALL (E) CONDUITS TO REMAIN. USE COPPER ANTI-SIZE ON THREADED CAPS. USE GALV. SPRAY ON (E) METAL CONDUITS WHERE GALV. COATING HAS BEEN DAMAGED FROM CUTTING OR HANDLING. APPLY EPOXY TO PLASTIC OR PVC CONDUIT CAPS.
12. SEE TABLE ON APPLICABLE SCHEDULE SHEET FOR SCHEDULES OF (E) ELECTRICAL EQUIPMENT, WIRING, AND CONDUITS TO BE DEMOLISHED IF APPLICABLE.
13. GENERALLY, (E) ELECTRICAL EQUIPMENT, WIRING, AND CONDUIT TO BE DEMOLISHED ARE SHOWN IN DARKER AND HEAVIER LINE TYPE AND LISTED IN SCHEDULES. SPECIFIC AREAS WHERE EQUIPMENT SHALL BE DEMOLISHED AND (E) LARGER EQUIPMENT TO BE DEMOLISHED ARE EXPLICITLY CALLED OUT WITH KEYNOTES.
14. PROVIDE CIRCUIT TRACE, AND COORDINATE WITH AND ASSIST SLAC OWNER REPRESENTATIVE AND SLAC ENGINEERS TO LOCATE (E) CONDUCTORS AND (E) SIGNAL WIRING END TO END AS REQ. FOR DEMOLITION.

DEMOLITION KEY NOTES

1. DISCONNECT AND COIL BACK (E) CONDUCTORS FROM (E) DISC. SWITCHES. REMOVE AND RETAIN (E) DISC. SWITCHES FOR RELOCATION. REMOVE (E) DISC. SWITCH CHANNEL STRUT SUPPORT STRUCTURES.

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC National Accelerator Laboratory
Construction Authorization (CD)
BY: Jennifer
DATE: 10/1/2026 FROM: Dan Ge
Revised Authorization ☒ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

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REGISTERED PROFESSIONAL ENGINEER
STACEY V. FOSTER
No. E24838
ELECTRICAL
STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E3.01D

SLAC NATIONAL ACCELERATOR LABORATORY | U.S. DEPARTMENT OF ENERGY

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		DATE
ENGR	KOKUEV, SERGEY	05-01-2026
DES	FERNANDEZ, HUGO	05-01-2026
CHKR	ORTIZ, JUSTIN	05-01-2026

APPROVALS — DATE
ZACHARIAH, SUE — 05-01-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
SIGNAL AND POWER DEMO PLAN

DRAWING NUMBER: B0999-ED1-0139 | REVISION: F | E

B0999-ED1-0139 - F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
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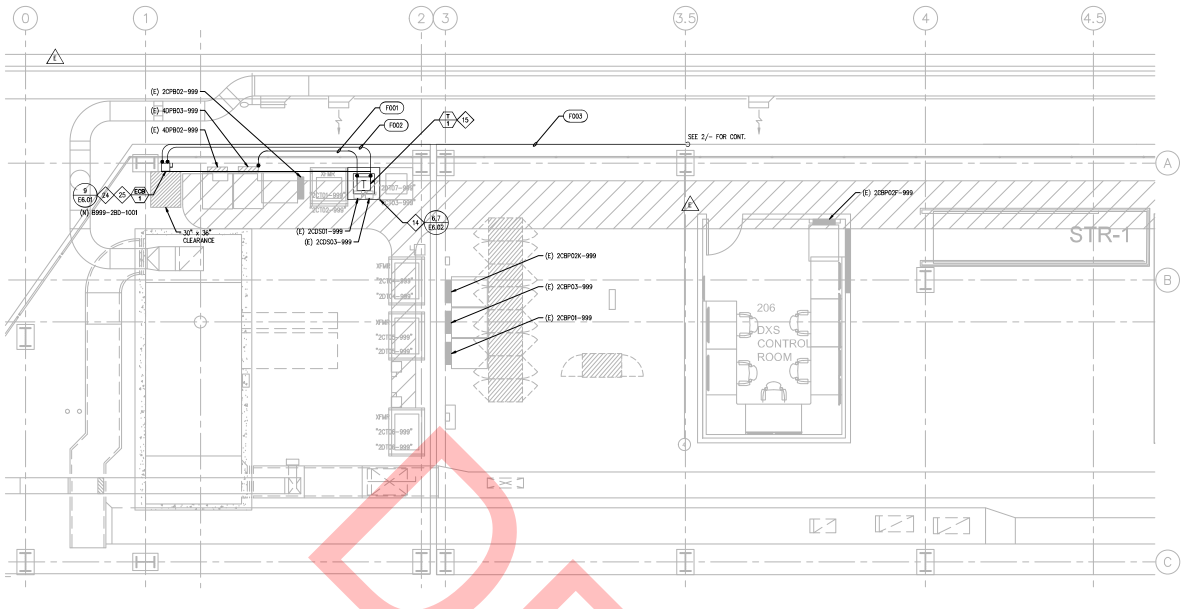
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

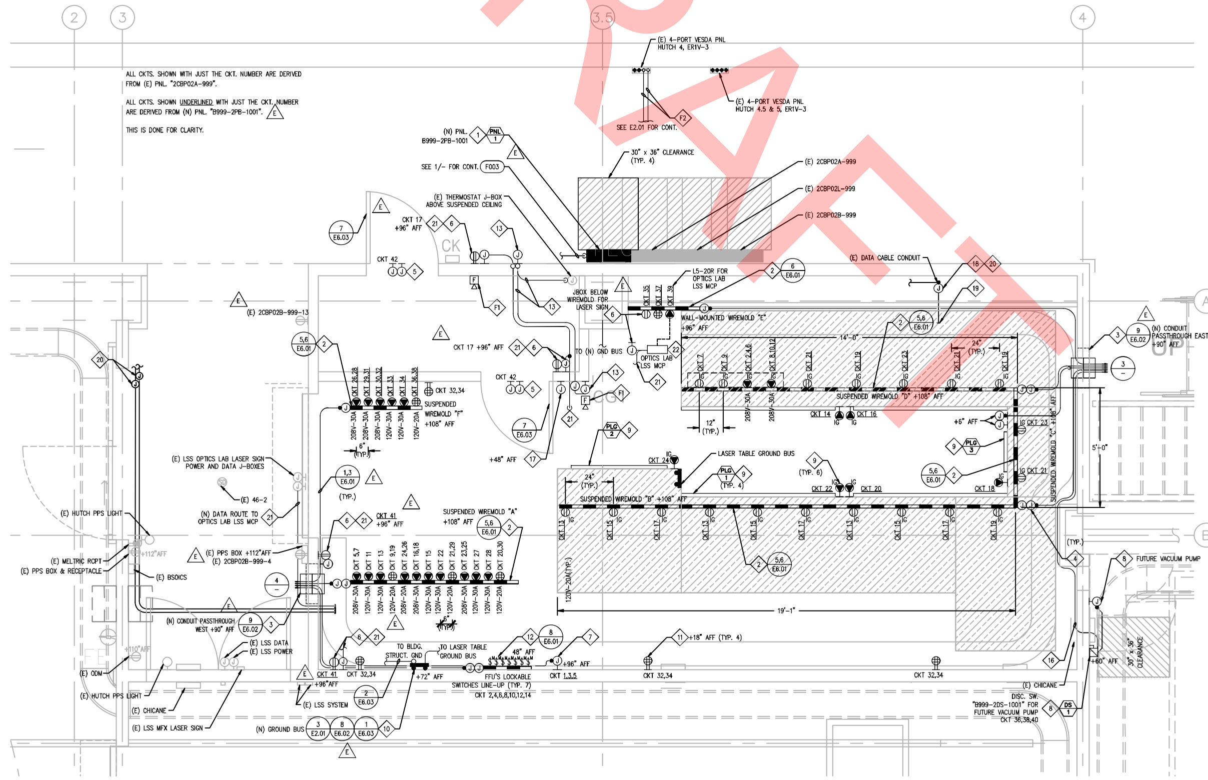


1 POWER PLAN — MEZZANINE LEVEL — SCALE : 1/4" = 1'-0"

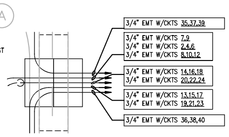
ALL CKTS. SHOWN WITH JUST THE CKT. NUMBER ARE DERIVED FROM (E) PNL. "2CBP02A-999".

ALL CKTS. SHOWN UNDERLINED WITH JUST THE CKT. NUMBER ARE DERIVED FROM (N) PNL. "B999-2PB-1001". (E)

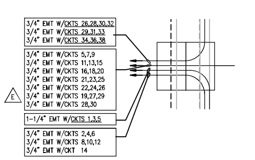
THIS IS DONE FOR CLARITY.



2 POWER PLAN — TUNNEL LEVEL — SCALE : 1/2" = 1'-0"



3 CONDUIT PASSTHROUGH (EAST) — N.T.S.



4 CONDUIT PASSTHROUGH (WEST) — N.T.S.

PLAN GENERAL NOTES

1. INFORMATION PROVIDED ON THESE CONSTRUCTION DOCUMENTS WAS GATHERED FROM FIELD OBSERVATION AND PREVIOUS RECORD DRAWINGS AND SHALL BE USED WITH CAUTION; CONTRACTOR SHALL FIELD VERIFY ALL QUANTITIES, ESPECIALLY THE EXACT COUNT OF DEVICES, ROUTING, SIZES, LENGTHS AND COUNTS OF CONDUIT AND CONDUCTORS TO BE INSTALLED AND OR REMOVED PRIOR TO STARTING THE RESPECTIVE WORK.
2. FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS SEE ELECTRICAL COVER SHEET.
3. WORK SHALL NOT INTERFERE WITH ADJACENT FACILITY USE AND OR FUNCTION. CONTRACTOR SHALL COORDINATE WITH SLAC OWNER REPRESENTATIVE AT LEAST 2-WEEKS PRIOR TO STARTING WORK TO ESTABLISH A MUTUALLY AGREED UPON SCHEDULE.
4. CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL OTHER TRADES.
5. CONTRACTOR SHALL MAINTAIN AND VERIFY CONTINUITY OF UPSTREAM AND DOWNSTREAM ELECTRICAL CIRCUITS DURING AND AFTER WORK IS COMPLETE.
6. CONTRACTOR SHALL FOLLOW MANUFACTURER'S MOUNTING, WIRING AND INSTALLATION INSTRUCTIONS FOR ALL ASSEMBLIES AND DEVICES UNLESS OTHERWISE NOTED.
7. CONTRACTOR SHALL COORDINATE ALL ROUTING OF CONDUIT AND WIRING WITH (E) CONDITIONS.
8. CONTRACTOR SHALL COORDINATE FINAL LOCATIONS OF RECEPT. W/ SLAC OWNER REPRESENTATIVE.
9. IF REQUIRED BY SLAC OWNER REPRESENTATIVE CONTRACTOR SHALL PAINT (N) CONDUIT IN ACCORDANCE W/ APPLICABLE PROCEDURES.
10. ELECTRICAL CIRCUITS AND EQUIPMENT THAT ARE SHOWN IN LIGHTER LINE WEIGHT OR IN GRAY COLOR ARE EXISTING.
11. SEE EQUIPMENT SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE EQUIPMENT TAGS.
12. SEE FEEDER SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE FEEDER TAGS.
13. NEUTRAL CONDUCTOR FOR SINGLE PHASE LOADS SHALL USE TRACER COLOR TO MATCH PHASE CONDUCTOR COLOR.
14. SEE PANEL SCHEDULE FOR DESCRIPTION OF SPECIAL PURPOSE RECEPTACLE NEMA TYPE.
15. (E) ALL EQUIPMENT, CONDUIT, AND WIRES NOT IN CONDUIT SHALL BE PLENUM-RATED ABOVE CEILING.
16. CONTRACTOR SHALL PROVIDE #4 NYLON PULL STRINGS IN ALL EMPTY CONDUITS.

PLAN KEY NOTES

1. PROVIDE (N) PANEL AND (N) BRANCH CIRCUITS IN HALLWAY FOR (N) LOADS IN OPTICS LAB AND GOWNING ROOM PER PANEL SCHEDULE. SEE SHT. E5.02.
2. PROVIDE (N) WIREMOLD, W/ (N) RECEPTACLES AS SHOWN AND W/ #10G ISOLATED GROUND BACK TO PANEL IF INDICATED (IG). USE #10AWG FOR CURRENT CARRYING CONDUCTORS AND GROUNDING CONDUCTORS. WIREMOLD EQUIPPED W/ POWER AND DATA SEPARATOR THROUGHOUT.
3. PROVIDE (N) 10"H X 20"W CONDUIT PASSTHROUGH W/ (N) 10"X10"X6" J-BOX MOUNTED AT INTERIOR AND PROVIDE (N) 10"X10"X6" J-BOX MOUNTED AT EXTERIOR. COVER UNUSED PASSTHROUGH W/ PLATE. PROVIDE SEALANT FOR ALL PENETRATIONS. ROUTE ALL CONDUIT TO EXTERIOR PANELS THROUGH CLOSEST PASSTHROUGH.
4. PROVIDE WIREMOLD "4010FDO" J-BOX FOR INTERCONNECTION BETWEEN CONDUITS AND RACEWAY
5. PROVIDE (N) POWER AND DATA J-BOX FOR DOOR ACCESS CONTROL SYSTEM. USE 1" EMT TO DATA J-BOX FROM CABLE TRAY AND 3/4" EMT FOR INTERCONNECTIONS AT DOOR. USE 3/4" EMT W/ 2#12AWG + #10G TO POWER J-BOX. COORDINATE INSTALLATION, ROUTING, AND CONNECTON W/ SLAC OWNER REPRESENTATIVE.
6. PROVIDE (N) DUPLEX RECEPTACLE AND (N) J-BOX FOR DATA FOR LSS SCROLLING MESSAGE SIGN. USE 3/4" EMT W/ 2#12AWG + #10G FOR POWER AND USE 3/4" EMT FOR DATA. DATA CABLES BY SLAC IT. COORDINATE W/ SLAC OWNER REPRESENTATIVE FOR EXACT J-BOX LOCATIONS AND ROUTING.
7. PROVIDE (N) BRANCH CKTS FOR FUTURE LASER EQUIPMENT. USE 1-1/4" EMT W/ 3#4AWG + #8G. CAP, TAPE-OFF, AND COIL CONDUCTORS INTO 10"X10"X6" MIN. J-BOX, 20LF SLACK.
8. PROVIDE (N) 30A RATED DISC. SW. FOR FUTURE VACUUM PUMP. USE 3/4" EMT W/ 3#10AWG + #10G FROM PANEL TO DISCONNECT AND FROM DISCONNECT TO (N) 10"X10"X6" J-BOX, CAPPED, TAPED-OFF, AND COILED WITHIN. FINAL J-BOX LOCATION AND FINAL CONNECTION TO (N) VACUUM PUMP BY SLAC. RADIATION PROTECTION BY SLAC.
9. PROVIDE (N) 120V PLUG-STRIP AND ASSOCIATED SURFACE MOUNTED TWIST LOCK RECEPTACLE BELOW BOTTOM EDGE OF LASER TABLE. USE 3/4" EMT W/ 2#12AWG + #10G FOR RECEPTACLE.
10. PROVIDE (N) GROUND BUS TERMINATED TO FACILITY GROUND LOOP USING #4/0 AWG BARE CU CONDUCTOR. TERMINATE LASER TABLE GROUND CONDUCTOR ON GROUND BUS.
11. PROVIDE (N) BRANCH CIRCUITS AND WALL RECESSED QUADPLEX RECEPTACLE, W/ EACH DUPLEX RECEPTACLE CONNECTED TO A SEPARATE CIRCUIT. USE 2#12AWG + #10G PER CIRCUIT.
12. PROVIDE (N) 120VAC LOCKABLE MOTOR STARTER SWITCHES. SEE CONTROL DEVICES SCHEDULE IN E0.02. FOR EACH SWITCH CIRCUIT USE 3/4" EMT W/ 2#12AWG + #10G.
13. PROVIDE (3) (N) J-BOXES FOR THERMOSTATS. INSTALL ONE J-BOX ABOVE CEILING LEVEL, THE SECOND WALL-MOUNTED AND THE THIRD W/ PULLWIRE OUTSIDE OF LASER ROOM FOR THERMOSTAT CONTROL WIRING. USE 3/4" EMT. COORDINATE THERMOSTAT INSTALLATION, ROUTING AND CONNECTION W/ SLAC OWNER REPRESENTATIVE AND MECHANICAL.
14. INSTALL (N) HSS STRUCTURE TO SUPPORT (N) XFMR "B999-4TX-1001" AND (E) DISC. SWITCHES. PROVIDE CHANNEL STRUT SUPPORTS BELOW HSS AND REINSTALL (E) RETAINED DISC. SWITCHES. RECONNECT CONDUCTORS FOR (E) DISC. SWITCHES.
15. PROVIDE (N) XFMR AND (N) FEEDERS. SEE SHEET E0.02 FOR EQUIPMENT AND FEEDER SCHEDULE.
16. (E) ROUTE CONDUIT THROUGH (E) CHICANE.
17. PROVIDE (N) 3/4" EMT W/ J-BOX FOR FUTURE CAT-6 FOR PHONE NEAR OPTICS LAB ENTRY DOOR IN GOWNING ROOM. COORDINATE W/SLAC IT FOR ROUTING.
18. PROVIDE (N) 8"W x 8"H x 4"D MIN. J-BOX. EXTEND (E) DATA CABLE CONDUIT TO (N) J-BOX. REINSTALL PREVIOUSLY DEMO'D CONDUIT ROUTING TO (N) J-BOX.
19. (E) EXTEND CONDUIT FROM (N) J-BOX USING 2" EMT TO (N) STUB-OUTS IN LASER LAB, PROTRUDING 3" THROUGH INNER WALL. COORDINATE EXACT LOCATION OF STUB-OUTS W/ SLAC OWNER REPRESENTATIVE.
20. COORDINATE W/ SLAC OWNER REPRESENTATIVE AND SLAC IT TO RECONNECT AND REROUTE (E) CABLES BACK THROUGH (N) J-BOX AND INTO (N) LASER LAB THROUGH (N) STUB-OUTS. ROUTE ONTO CABLE TRAY TO FINAL TERMINATION.
21. ROUTE LSS CAT-6 CABLES FROM LSS SYSTEMS DEVICES TO LSS MCP THROUGH LADDER CABLE TRAY. COORDINATE W/ SLAC REPRESENTATIVE FOR EQUIPMENT CONNECTION AND EXACT ROUTE. PROVIDE A J-BOX AT LSS MCP HEIGHT TO GATHER INCOMING CAT-6 CABLES.
22. COORDINATE W/ SLAC OWNER REPRESENTATIVE FOR OPTICS LAB LSS MCP FINAL MOUNTING LOCATION.

PLAN KEY NOTES (CONT.)

23. EXTEND CONDUIT FROM (E) J-BOX USING 3/4" EMT TO (N) STUB-OUTS IN LASER LAB PROTRUDING 3" BEYOND INNER WALL AT +9'-6" AFF SUCH THAT CATEGORY CABLES CAN BE PULLED INTO CABLE TRAY. PROVIDE SEALANT FOR PENETRATIONS, SAD. COORDINATE EXACT LOCATION OF STUBS-OUT W/ SLAC OWNER REPRESENTATIVE.
24. PROVIDE (N) LSIG ENCLOSED CIRCUIT BREAKER AND (N) FEEDER TO (N) PANEL. USE (N) CHANNEL STRUT TO SUPPORT.
25. PROVIDE (N) VOLTAGE TESTER, RATED AT 1000V, SAFE-TEST POINT MODEL "R-3MT-1K-KIT-H" OR EQUIVALENT. SEE DETAIL 5/E6.02 FOR TYPICAL MOUNTING AND WIRING DIAGRAM. MOUNT TESTER TO ENCLOSED CIRCUIT BREAKER.

FIRE ALARM PLAN KEY NOTES

F1. RE-INSTALL RETAINED HORN/STROBE, RE-USE (E) FIRE ALARM CABLES, (E) CONDUIT, AND (E) HARDWARE, COORDINATE INSTALLATION W/ SLAC OWNER REPRESENTATIVE AND FIRE TECHNICIANS.
F2. PROVIDE (N) 3/4" DIA. VESDA SAMPLING TUBES, ROUTE ALONG W/(E) INTO (N) LASER LAB. COORDINATE INSTALLATION W/ SLAC OWNER REPRESENTATIVE AND FIRE TECHNICIANS.

SLAC BUILDING INSPECTION OFFICE — Construction Authorization (IFC) — BY: cnadler — DATE: 5/31/2026 — PRS#: 26-18 — Revised Authorization: ☑ No ☐ Yes — THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

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REGISTERED PROFESSIONAL ENGINEER — SERGEY V. KOROLEV — E20491 — EXP.09/30/27 — ELECTRICAL — STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E3.01

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ENGR KOROLEV, SERGEY 05-18-2026; DES FERNANDEZ, HUGO 05-18-2026; CHKR ORTIZ, JUSTIN 05-18-2026; APPROVALS ZACHARIAH, OBIL 05-18-2026

B999
OPTICS LAB DESIGN
ELECTRICAL
SIGNAL AND POWER PLAN

DRAWING NUMBER: B0999-EP1-0140 — REVISION: F — E

B0999-EP1-0140 - F — E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

PLAN GENERAL NOTES

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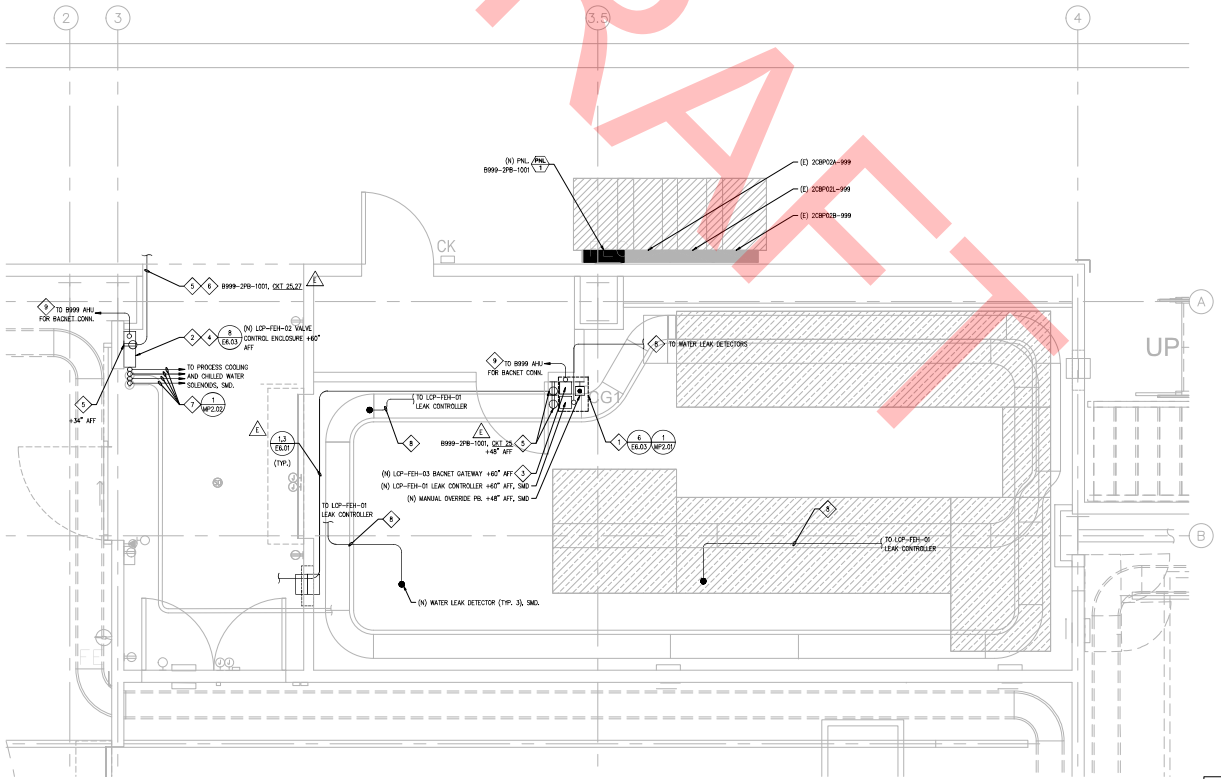
12. SEE FEEDER SCHEDULE ON APPLICABLE SCHEDULE SHEET FOR RESPECTIVE FEEDER TAGS.
13. NEUTRAL CONDUCTOR FOR SINGLE PHASE LOADS SHALL USE TRACER COLOR TO MATCH PHASE CONDUCTOR COLOR.
14. SEE PANEL SCHEDULE FOR DESCRIPTION OF SPECIAL PURPOSE RECEPTACLE NEMA TYPE.
15. ALL EQUIPMENT, CONDUIT, AND WIRES NOT IN CONDUIT SHALL BE PLENUM-RATED ABOVE CEILING.
16. CONTRACTOR SHALL PROVIDE #4 NYLON PULL STRINGS IN ALL EMPTY CONDUITS.

PLAN KEY NOTES

1. (N) WATER LEAK DETECTION SYSTEM LINE-UP, SMD. PROVIDE ALL (N) REQUIRED INTERCONNECTIONS AND DEVICES.
2. (N) LCP-FEH-02 VALVE CONTROL ENCLOSURE, SMD FOR VALVE LOCATION. PROVIDE ALL (N) REQUIRED INTERCONNECTIONS AND DEVICES.
3. PROVIDE (N) LCP-FEH-03 BACNET GATEWAY IN (N) 16"W X 16"H X 6"D MIN. NEMA 1 ENCLOSURE, ALIGN HEIGHT TO MATCH (N) LCP-FEH-01 LEAK CONTROLLER, SMD.
4. PROVIDE (N) ALC BUILDING CONTROLLER AND SOLENOID RELAYS IN (N) 24"W X 24"H X 6"D MIN. NEMA 1 ENCLOSURE.
5. PROVIDE (N) DUPLEX RECEPTACLE W/CLEAR WP IN-USE COVER AND BRANCH CKT USE 3/4"EMT W/2-#12AWG + #10G. PROVIDE (N) ESC EXTENSION FROM RECEPTACLE TO RESPECTIVE ENCLOSURE GROUNDING LUG USE 3/4"EMT W/#10G.
6. PROVIDE (N) SOLENOID CONTROL RELAY CONTROL POWER BRANCH CKT USE 3/4"EMT W/2-#12AWG + #10G.
7. PROVIDE (N) SOLENOID CONTROL CKT USE 3/4" EMT W/ 3-#14AWG + #10G, LAST 3LF SHALL BE WP FLEX W/ 3/4"MPT CONNECTOR TO VALVE BODY, SMD FOR VALVE LOCATION.
8. PROVIDE (N) RSC CABLE AND (N) EOL RESISTORS TO INTERCONNECT (N) WATER LEAK DETECTORS TO (N) LDR4G ZONE CONTROLLER. USE 3/4" EMT UP TO (N) LADDER CABLE TRAY, ROUTE THROUGH (N) LADDER CABLE TRAY.
9. PROVIDE (N) 3/4"EMT TO UPSTREAM ALC DEVICE LOCATED AT B999 AHU ON MEZZANINE LEVEL, COORDINATE W/ SLAC OWNER REPRESENTATIVE FOR FINAL ROUTING, AND COORDINATE W/ SLAC IT AND I&C FOR TERMINATIONS AND INTERCONNECTION.



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1 SIGNAL AND POWER PLAN
WATER LEAK DETECTION SYSTEM
SCALE : 1/2" = 1'-0"

NORTH

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REGISTERED PROFESSIONAL ENGINEER — JUSTIN K. VOGLEY — ELECTRICAL — STATE OF CALIFORNIA

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04	E3.02

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ENGR	KOGLEY, JEREMY	05-01-2026	
DES	FERNANDEZ, HUGO	05-01-2026	
CHKR	ORTE, JUSTIN	05-01-2026	

APPROVALS — DATE

B999
OPTICS LAB DESIGN
ELECTRICAL
SIGNAL AND POWER PLAN

DRAWING NUMBER	REVISION	
B0999-EP1-0141	F	E

B0999-EP1-0141 - F | E

DRAFT

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
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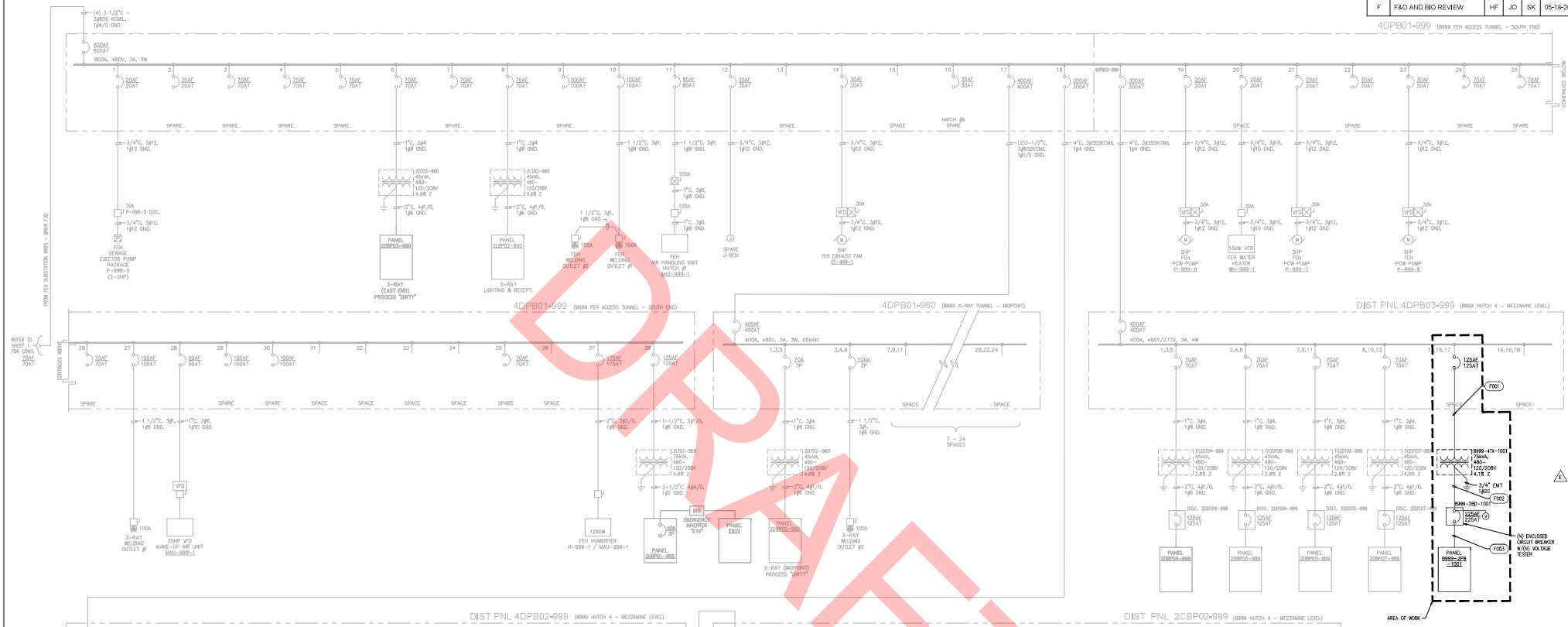
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026



DRAFT

SLD GENERAL NOTES

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2. PRIOR TO RE-ENERGIZING ANY EQUIPMENT, SLAC OWNER REPRESENTATIVE SHALL PROVIDE READINESS REVIEW OF ALL DISTRIBUTION EQUIPMENT IN THE SCOPE OF WORK. CONTRACTOR SHALL ASSIST AND COORDINATE W/ SLAC STAFF AS REQUIRED TO COMPLETE THE READINESS REVIEW.
3. SEE E0.02 FOR FEEDER SCHEDULE.

SLD KEY NOTES

1. SINGLE LINE DIAGRAM COPIED FROM DCR STAMPED DRAWING "D-383-900-17" (REV. "D3", DATED 06/21/2024). SINGLE LINE FIELD VERIFIED BY CBE ZACHARIAH ON 11/07/2025.
2. CONTRACTOR MAY NOT PERFORM WORK ON LEGACY SINGLE-PHASE CIRCUITS OR IN LEGACY (PRIOR TO 2019) ELECTRICAL PANELBOARDS THAT CONTAIN SINGLE PHASE CIRCUITS UNLESS NEUTRAL WIRING VERIFICATION OF THE SINGLE-PHASE CIRCUIT IN THE PANEL HAS BEEN PERFORMED AND DOCUMENTED IN ACCORDANCE WITH SLAC-I-798-404-0W6 "OPERATIONS ON SYSTEMS WITH SUSPECTED SHARED NEUTRALS". SEE ESH MANUAL CHAPTER 8 ELECTRICAL SAFETY MANUAL SECTION 7.2.13. IF THE VERIFICATION HAS NOT BEEN PERFORMED, THEN IT MUST BE PERFORMED PRIOR TO START OF CONSTRUCTION.

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ENGR		APPROVALS	DATE
DES			
CHKR			

B999
OPTICS LAB DESIGN
ELECTRICAL
SINGLE LINE DIAGRAM

DRAWING NUMBER	REVISION	
B0999-E07-0142	F	E

B0999-E07-0142 - F E

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
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E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

PANELS GENERAL NOTES

1. CONTRACTOR SHALL COMPLY WITH ALL NOTES AS LISTED FOR EACH RESPECTIVE PNL.
2. CONTRACTOR SHALL PROVIDE (N) TYPED PANEL SCHEDULE FOR EACH ELECTRICAL PANEL, PLACE IN CLEAR PLASTIC SLEEVE AND ATTACH TO INNER SURFACE OF PANEL DOOR.
3. CONTRACTORS SHALL NOT PERFORM WORK ON LEGACY SINGLE-PHASE CIRCUITS OR IN LEGACY ELECTRICAL PANELBOARDS (LEGACY = INSTALLED PRIOR TO 2019) THAT CONTAIN SINGLE PHASE CIRCUITS UNLESS NEUTRAL WIRING VERIFICATION OF ALL SINGLE-PHASE CIRCUITS IN THE PANEL HAS BEEN PERFORMED AND DOCUMENTED IN ACCORDANCE WITH SLAC-I-708-404-096 OPERATIONS ON SYSTEMS WITH SUSPECTED SHARED NEUTRALS. SEE ESH MANUAL CHAPTER 8 ELECTRICAL SAFETY MANUAL SECTION 7.2.13. IF THE VERIFICATION HAS NOT BEEN PERFORMED, THEN IT MUST BE PERFORMED BY F&O EPD PRIOR TO START OF PROJECT CONSTRUCTION.

PANELS KEY NOTES

1. EXISTING PANEL SCHEDULE VERIFIED BY CIBIL ZACHARIAH ON 11/07/2025.
2. ALL ELECTRICAL PANELS SHALL BE INSPECTED FOR SHARED NEUTRALS BY ELECTRICAL CONTRACTOR PRIOR TO BEING RE-ENERGIZED IN ACCORDANCE W/ SLAC-I-708-404-096 REV 01, REPORT FINDINGS TO EEOR AND SLAC OWNER REPRESENTATIVES PRIOR TO PROCEEDING.

5 (E) PNL 2CPB02-999 W/ (E) SCHED. (FOR REFERENCE ONLY)

VOLTS: 208/120 PHASE: 3 WIRE: 4 BUSSING: 400A POLES: 30
EXIST ☑ NEW ☐
PANEL SCHEDULE 2CPB02-999
MAIN BRKR: 400A FED FROM: 4DPB02-999 LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 10kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
PANEL 2CBP02B-999	M	7.58			100/3	1	2	100/3	7.63			M	PANEL 2CBP02C-999
-	M		8.37		-	3	4	-		6.81		M	-
-	M			8.37	-	5	6	-			7.51	M	-
PANEL 2CBP02A-999	M	9.38			100/3	7	8	100/3	10.47			M	PANEL 2CBP02D-999
-	M		9.38		-	9	10	-		10.61		M	-
-	M			9.38	-	11	12	-			9.15	M	-
PANEL 2CBP02E-999	M	8.62			100/3	13	14	100/3	6.88			M	PANEL 2CBP02G-999
-	M		7.51		-	15	16	-		7.47		M	-
-	M			7.62	-	17	18	-			7.13	M	-
SPARE	*	0.00			100/3	19	20	100/3	10.32			M	PANEL 2CBP02L-999
-	*		0.00		-	21	22	-		9.75		M	-
-	*			0.00	-	23	24	-			8.72	M	-
2CBP02K-999	M	4.03			50/3	25	26	100/3	7.99			M	PANEL 2CBP02M-999
-	M		4.03		-	27	28	-		13.61		M	-
-	M			4.27	-	29	30	-			14.01	M	-
		29.61	29.29	29.64					43.29	48.25	46.52		

DRAWING #
EQUIP. TAG A02831

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	226.60	100%	226.60
TYPE "L": LIGHTING / CONTINUOUS LOADS	0.00	125%	0.00
TYPE "R": RECEPTACLES (FIRST 10KVA)	0.00	100%	0.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	0.00
TYPE "H": LARGEST MOTOR LOAD	0.00	125%	0.00
TYPE "H": HVAC / MECHANICAL LOADS	0.00	100%	0.00
TOTALS:	226.60		226.60

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 72.90 KVA
PHASE B: 77.54 KVA
PHASE C: 76.16 KVA
DEMAND FACTOR: 45.0%
LIMIT FACTOR 112.5KVA XFMR.
283.04 AMPS

3 (E) PNL 2CBP02A-999 W/ (E) SCHED.

VOLTS: 208Y/120 PHASE: 3 WIRE: 4 BUSSING: 250A POLES: 42
EXIST ☑ NEW ☐
PANEL SCHEDULE 2CBP02A-999
MAIN BRKR: 100A FED FROM: 2CPB02-999 LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 10kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
SPARE	*	0.00			20/1	1	2	20/1	0.00			*	SPARE
SPARE	*		0.00		20/1	3	4	20/1		0.00		*	SPARE
SPARE	*			0.00	20/1	5	6	20/1			0.00	*	SPARE
SPARE	*	0.00			20/1	7	8	20/1	0.00			*	SPARE
SPARE	*		0.00		20/1	9	10	20/1		0.00		*	SPARE
SPARE	*			0.00	20/1	11	12	20/1			0.00	*	SPARE
SPARE	*	0.00			20/1	13	14	20/1	0.00			*	SPARE
SPARE	*		0.00		20/1	15	16	20/1		0.00		*	SPARE
SPARE	*			0.00	20/1	17	18	20/1			0.00	*	SPARE
SPARE	*	0.00			20/1	19	20	20/1	0.00			*	SPARE
SPARE	*		0.00		20/1	21	22	20/1		0.00		*	SPARE
SPARE	*			0.00	20/1	23	24	20/1			0.00	*	SPARE
SPARE	*	0.00			20/1	25	26	20/1	0.00			*	SPARE
SPARE	*		0.00		20/1	27	28	20/1		0.00		*	SPARE
SPARE	*			0.00	20/1	29	30	20/1			0.00	*	SPARE
3P LEVITON SUB METERS	M	0.05			20/3	31	32	*				*	SPACE
-	M		0.05		-	33	34	*				*	SPACE
-	M			0.05	-	35	36	*				*	SPACE
HALLW.3 ROLLUP DOOR ACCESS C	M	0.40			20/1	37	38	*				*	SPACE
SPACE	*				*	39	40	*				*	SPACE
SPACE	*				*	41	42	*				*	SPACE
		0.45	0.05	0.05					0.00	0.00	0.00		

DRAWING #
EQUIP. TAG A02843

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	0.55	100%	0.55
TYPE "L": LIGHTING / CONTINUOUS LOADS	0.00	125%	0.00
TYPE "R": RECEPTACLES (FIRST 10KVA)	0.00	100%	0.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	0.00
TYPE "H": LARGEST MOTOR LOAD	0.00	125%	0.00
TYPE "H": HVAC / MECHANICAL LOADS	0.00	100%	0.00
TOTALS:	0.55		0.55

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 0.45 KVA
PHASE B: 0.05 KVA
PHASE C: 0.05 KVA
1.53 AMPS

1 (E) PNL 4DPB03-999 W/ (E) SCHED.

VOLTS: 480/277 PHASE: 3 WIRE: 4 BUSSING: 400A POLES: 18
EXIST ☑ NEW ☐
DISTRIBUTION PANEL 4DPB03-999
MAIN BRKR: 400A FED FROM: 4DPB01-999 LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 14kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
TX 2DT04-999	M	10.31			70/3	1	2	70/3	9.05			M	TX2 DT06-999
	M		9.84			3	4			10.16		M	
	M			6.19		5	6				6.37	M	
TX 2DT05-999	M	10.69			70/3	7	8	70/3	15.24			M	TX 2DT07-999
	M		11.76			9	10			14.55		M	
	M			10.48		11	12				14.08	M	
SPACE	*				*	13	14	*				*	SPACE
	*					15	16					*	
	*					17	18					*	
		21.00	21.60	16.67					24.29	24.71	20.45		

DRAWING #
EQUIP. TAG A02829

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	128.72	100%	128.72
TYPE "L": LIGHTING / CONTINUOUS LOADS	0.00	125%	0.00
TYPE "R": RECEPTACLES (FIRST 10KVA)	0.00	100%	0.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	0.00
TYPE "H": LARGEST MOTOR LOAD	0.00	125%	0.00
TYPE "H": HVAC / MECHANICAL LOADS	0.00	100%	0.00
TOTALS:	128.72		128.72

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 45.29 KVA
PHASE B: 46.31 KVA
PHASE C: 37.12 KVA
DEMAND FACTOR: 100.0%
LIMIT FACTOR 300A CB
154.83 AMPS

6 (N) PNL B999-2PB-1001 W/ (N) SCHED.

VOLTS: 208Y/120 PHASE: 3 WIRE: 4 BUSSING: 250A POLES: 54
EXIST ☐ NEW ☑
PANEL SCHEDULE B999-2PB-1001
MAIN BRKR: 225A FED FROM: 4DPB03-999 VIA 75KVA XFMR LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 22kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
LASER JB.	M	6.70			70/3	1	2	30/3	2.80			R	WIREMOLD D LASER L21-30R
-	M		6.70		-	3	4	-		2.80		R	-
-	M			6.70	-	5	6	-			2.80	R	-
WIREMOLD D RECEPTS.	R	0.54			20/1	7	8	30/3	2.80			R	WIREMOLD D LASER L21-30R
WIREMOLD D RECEPTS.	R		0.54		20/1	9	10	-		2.80		R	-
SPARE	*			0.00	20/1	11	12	-			2.80	R	-
WIREMOLD B,C,D RECEPTS.	R	0.54			20/1	13	14	20/1	1.08			R	PLUGSTRIP 5-20R
WIREMOLD B,C,D RECEPTS.	R		0.54		20/1	15	16	20/1		1.08		R	PLUGSTRIP 5-20R
WIREMOLD B,C,D RECEPTS.	R			0.54	20/1	17	18	20/1			0.90	R	PLUGSTRIP 5-20R
WIREMOLD B,C,D RECEPTS.	R	0.54			20/1	19	20	20/1	1.08			R	PLUGSTRIP 5-20R
WIREMOLD B,C,D RECEPTS.	R		0.54		20/1	21	22	20/1		1.08		R	PLUGSTRIP 5-20R
WIREMOLD B,C,D RECEPTS.	R			0.54	20/1	23	24	20/1			1.08	R	PLUGSTRIP 5-20R
WATER LEAK DETECTION SYSTEM	R	0.36			20/1	25	26	30/2	1.50			R	WIREMOLD F L6-30R
WATER LEAK VALVE SOLENOIDS	M		0.28		20/1	27	28	-		1.50		R	-
WIREMOLD F L6-30R	R			1.50	30/2	29	30	30/2			1.50	R	WIREMOLD F L6-30R
-	R	1.50			-	31	32	-	1.50			R	-
WIREMOLD F L5-30R	R		1.20		30/1	33	34	30/1		1.20		R	WIREMOLD F L5-30R
LSS SIGNS RECEPTS.	R			0.74	20/1	35	36	20/1			0.36	R	WIREMOLD F QUAD RECEPT.
WIREMOLD E QUAD	R	0.36			20/1	37	38	20/1	0.36			R	WIREMOLD F QUAD RECEPT.
WIREMOLD E LSS L5-20R	R		1.20		20/1	39	40	20/1		0.00		*	SPARE
LSS SIGNS RECEPTS.	R			0.74	20/1	41	42	20/1			0.00	*	SPARE
SPACE	*				*	43	44	*				*	SPACE
SPACE	*				*	45	46	*				*	SPACE
SPACE	*				*	47	48	*				*	SPACE
SPACE	*				*	49	50	*				*	SPACE
SPACE	*				*	51	52	*				*	SPACE
SPACE	*				*	53	54	*				*	SPACE
		10.54	11.00	10.76					11.12	10.46	9.44		

DRAWING #
EQUIP. TAG

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	20.38	100%	20.38
TYPE "L": LIGHTING / CONTINUOUS LOADS	0.00	125%	0.00
TYPE "R": RECEPTACLES (FIRST 10KVA)	42.94	100%	10.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	16.47
TYPE "H": LARGEST MOTOR LOAD	0.00	125%	0.00
TYPE "H": HVAC / MECHANICAL LOADS	0.00	100%	0.00
TOTALS:	63.32		46.85

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 21.66 KVA
PHASE B: 21.46 KVA
PHASE C: 20.20 KVA
130.04 AMPS

4 (E) PNL 2CBP02A-999 W/ (N) SCHED.

VOLTS: 208Y/120 PHASE: 3 WIRE: 4 BUSSING: 250A POLES: 42
EXIST ☑ NEW ☐
PANEL SCHEDULE 2CBP02A-999
MAIN BRKR: 100A FED FROM: 2CPB02-999 LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 10kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
LIGHTING GOWNING ROOM	L	0.36			20/1	1	2	15/1	0.58			H	B0999-FFU-1001
LIGHTING OPTICS LAB	L		0.74		20/1	3	4	15/1		0.58		H	B0999-FFU-1002
WIREMOLD A L6-30R	R			1.50	30/2	5	6	15/1			0.58	H	B0999-FFU-1003
-	R	1.50			-	7	8	15/1	0.58			H	B0999-FFU-1004
WIREMOLD A QUAD	R		0.36		20/1	9	10	15/1		0.58		H	B0999-FFU-1005
WIREMOLD A L5-30R	R			1.20	30/1	11	12	15/1			0.58	H	B0999-FFU-1006
WIREMOLD A L5-30R	R	1.20			30/1	13	14	15/1	0.58			H	B0999-FFU-1007
WIREMOLD A L5-30R	R		1.20		30/1	15	16	30/2		1.50		R	WIREMOLD A L6-30R
LSS SIGNS RECEPTS.	R			0.74	20/1	17	18	-			1.50	R	-
WIREMOLD A QUAD	R	0.36			20/1	19	20	20/1	0.36			R	WIREMOLD A QUAD
WIREMOLD A QUAD	R		0.36		20/1	21	22	30/1		1.20		R	WIREMOLD A L5-30R
WIREMOLD A L6-30R	R			1.50	30/2	23	24	20/2			1.20	R	WIREMOLD A L6-20R
-	R	1.50			-	25	26	-	1.20			R	-
WIREMOLD A L5-30R (struck through)	R		1.20		30/1	27	28	30/1		1.20		R	WIREMOLD A L5-30R
WIREMOLD A QUAD	R			0.36	20/1	29	30	20/1			0.36	R	WIREMOLD A QUAD
3P LEVITON SUB METERS	M	0.05			20/3	31	32	20/1	0.72			R	OPTICS LAB QUADS
-	M		0.05		-	33	34	20/1		0.72		R	OPTICS LAB QUADS
-	M			0.05	-	35	36	15/3			1.40	H	VACUUM PUMP DISC. SW.
HALLW.3 ROLLUP DOOR ACCESS CTRL (struck through)	M	0.40			20/1	37	38	-	1.40			H	-
SPARE	*		0.00		20/1	39	40	-		1.40		H	-
SPARE	*			0.00	20/1	41	42	20/1			0.40	M	GOWNING & OPT. LAB ACCESS CTRL
		5.37	3.91	5.35					5.42	7.18	6.02		

DRAWING #
EQUIP. TAG

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	0.95	100%	0.95
TYPE "L": LIGHTING / CONTINUOUS LOADS	1.10	125%	1.38
TYPE "R": RECEPTACLES (FIRST 10KVA)	22.94	100%	10.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	6.47
TYPE "H": LARGEST MOTOR LOAD	4.20	125%	5.25
TYPE "H": HVAC / MECHANICAL LOADS	4.06	100%	4.06
TOTALS:	33.25		28.11

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 10.79 KVA
PHASE B: 11.09 KVA
PHASE C: 11.37 KVA
78.01 AMPS

2 (E) PNL 4DPB03-999 W/ (N) SCHED.

VOLTS: 480/277 PHASE: 3 WIRE: 4 BUSSING: 400A POLES: 18
EXIST ☑ NEW ☐
DISTRIBUTION PANEL 4DBP03-999
MAIN BRKR: 400A FED FROM: 4DPB01-999 LOCATION: BLDG 999 - FEH MOUNTED: SURFACE AIC RATING: 14kAIC

LOAD DESCRIPTION	TYPE	A	B	C	BRKR.	CKT.	CKT.	BRKR.	A	B	C	TYPE	LOAD DESCRIPTION
TX 2DT 04-999	M	10.31			70/3	1	2	70/3	9.05			M	TX 2DT 06-999
	M		9.84			3	4			10.16		M	
	M			6.19		5	6				6.37	M	
TX 2DT 05-999	M	10.69			70/3	7	8	70/3	15.24			M	TX 2DT 07-999
	M		11.76			9	10			14.55		M	
	M			10.48		11	12				14.08	M	
B999-4TX-1001	M	23.02			125/3	13	14	*				*	SPACE
	M		22.82			15	16					*	
	M			20.20		17	18					*	
		44.02	44.42	36.87					24.29	24.71	20.45		

LSIG BREAKER

DRAWING #
EQUIP. TAG A02829

	CONN. KVA	DEMAND FACTOR	DEMAND KVA
TYPE "M": NON-CONTINUOUS / MISC. LOADS	194.76	100%	194.76
TYPE "L": LIGHTING / CONTINUOUS LOADS	0.00	125%	0.00
TYPE "R": RECEPTACLES (FIRST 10KVA)	0.00	100%	0.00
TYPE "R": RECEPTACLES (OVER 10KVA)		50%	0.00
TYPE "H": LARGEST MOTOR LOAD	0.00	125%	0.00
TYPE "H": HVAC / MECHANICAL LOADS	0.00	100%	0.00
TOTALS:	194.76		194.76

BOLD = NEW LOAD, NEW BREAKER
PHASE A: 68.31 KVA
PHASE B: 69.13 KVA
PHASE C: 57.32 KVA
DEMAND FACTOR: 100.0%
LIMIT FACTOR 300A CB
234.26 AMPS

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (IFC)
Revised Authorization ☑ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

Vektor Engineering & Consulting Services, Inc.
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REGISTERED PROFESSIONAL ENGINEER SERGEY V. KOROLEV E20491 EXP: 09/30/27 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04 | E5.02

SLAC NATIONAL ACCELERATOR LABORATORY — U.S. DEPARTMENT OF ENERGY

B999
OPTICS LAB DESIGN
ELECTRICAL
PANEL SCHEDULES

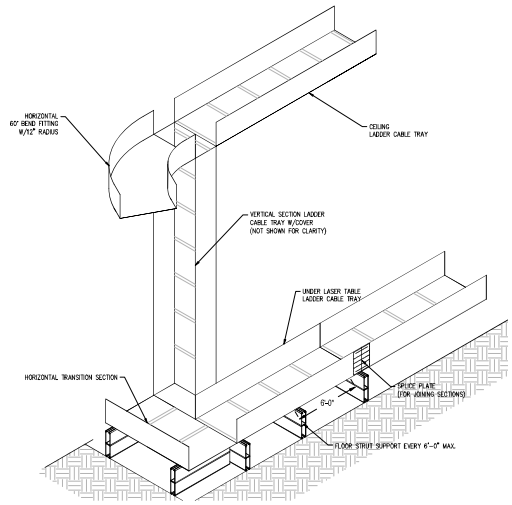
THE DRAWINGS, SPECIFICATIONS AND OTHER DATA HEREIN PROVIDED SHALL NOT BE COPIED, PUBLISHED OR OTHERWISE FURTHER DISSEMINATED WITHOUT PRIOR WRITTEN PERMISSION OF STANFORD UNIVERSITY / SLAC.

ENGR KOROLEV, SERGEY 05-18-2026
DES FERNANDEZ, HUGO 05-18-2026
CHKR ORTIZ, JUSTIN 05-18-2026
APPROVALS ZACHARIAH, CIBIL DATE 05-18-2026

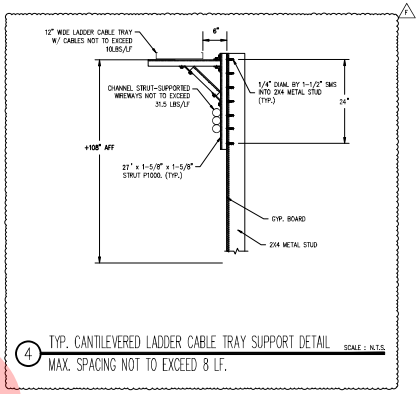
DRAWING NUMBER B0999-E06-0143 REVISION F E

B0999-E06-0143 - F E

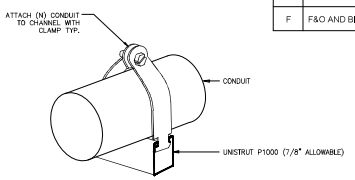
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026



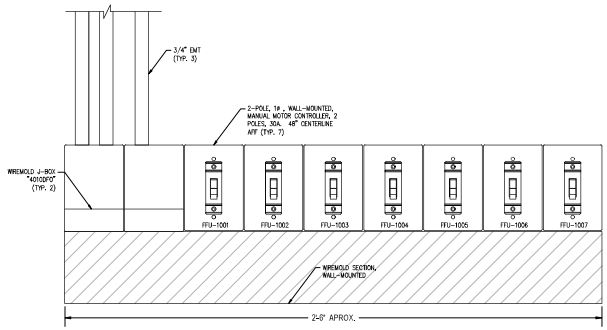
7 LADDER CABLE TRAY TRANSITION SCALE : N.T.S.



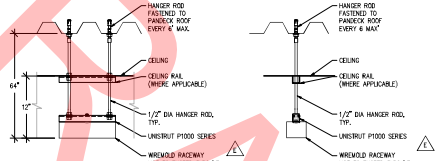
4 TYP. CANTILEVERED LADDER CABLE TRAY SUPPORT DETAIL SCALE : N.T.S.
MAX. SPACING NOT TO EXCEED 8 LF.



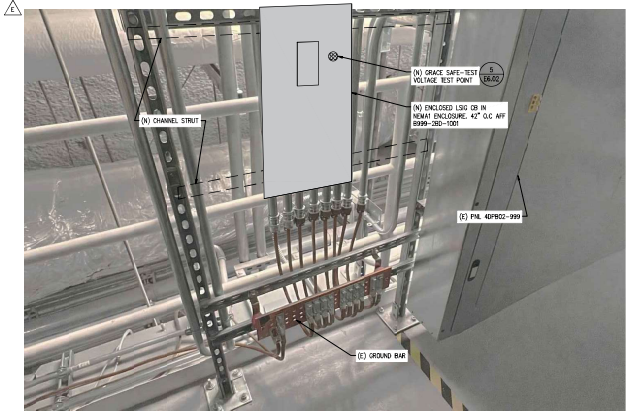
1 TYP. CONDUIT SUPPORT DETAIL SCALE : N.T.S.
CHANNEL STRUT



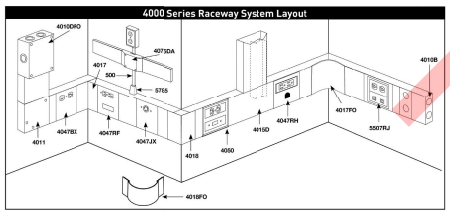
8 FFU LOCKABLE SWITCHES LINE-UP SCALE : N.T.S.



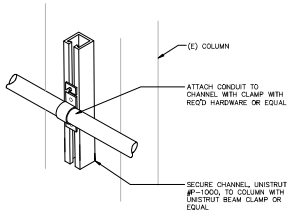
5 TYP. CEILING SUSPENDED WIREMOLD DETAIL SCALE : N.T.S.



9 (N) LOCATION OF ENCLOSED CIRCUIT BREAKER SCALE : N.T.S.
FOR REFERENCE ONLY



6 WM-1 LEGRAND 4000 SERIES COMPONENTS SCALE : N.T.S.



3 TYP. CONDUIT SUPPORTS SCALE : N.T.S.
COLUMNS OR WALLS

DRAFT

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APPROVALS | DATE

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OPTICS LAB DESIGN
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DETAILS

DRAWING NUMBER: B0999-E05-0144 | REVISION: F | E

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REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
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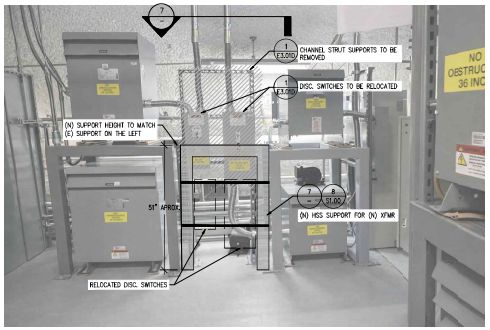
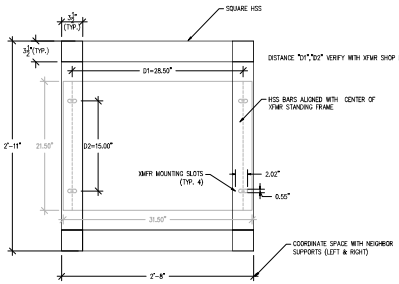
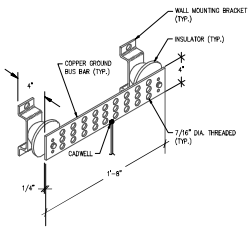
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026



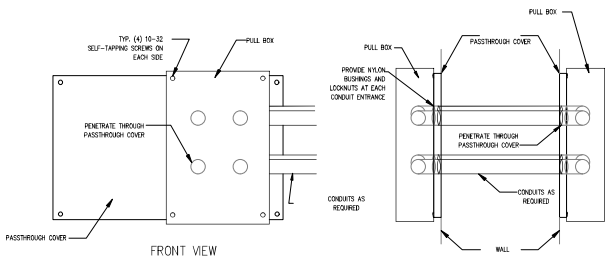
6 (N) XFMR SUPPORT INFRASTRUCTURE SCALE : N.T.S.



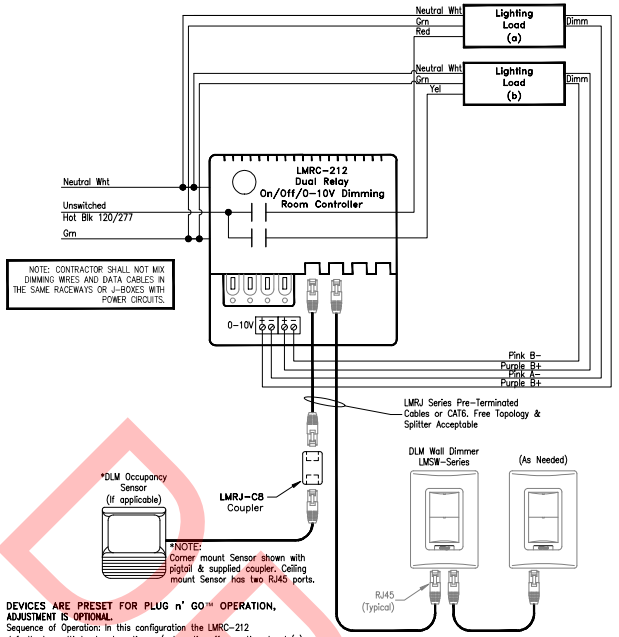
7 HSS XFMR SUPPORT DETAIL TOP VIEW SCALE : N.T.S.



8 GROUND BUS BAR DETAIL SCALE : N.T.S.



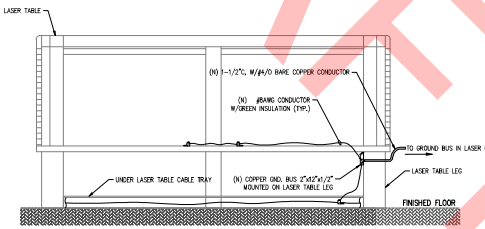
9 PASSTHROUGH PENETRATION DETAIL SCALE : N.T.S.



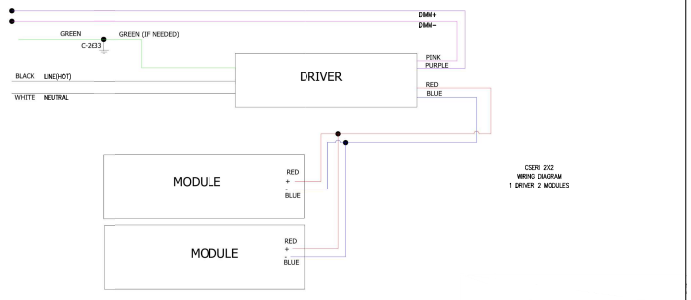
DEVICES ARE PRESET FOR PLUG n' GO™ OPERATION, ADJUSTMENT IS OPTIONAL.
Sequence of Operation: In this configuration the LMRC-212 defaults to multi-level automatic-on/automatic-off operation. Load (a) on the LMRC-212 turns on automatically, while Load (b) defaults to manual-on control; all relays turn off automatically. Enhanced room controllers support up to 64 loads and 48 devices per DLM local network. For full operational details, adjustments and more features of the product, see the DLM System Installation Guide at www.wattstopper.com

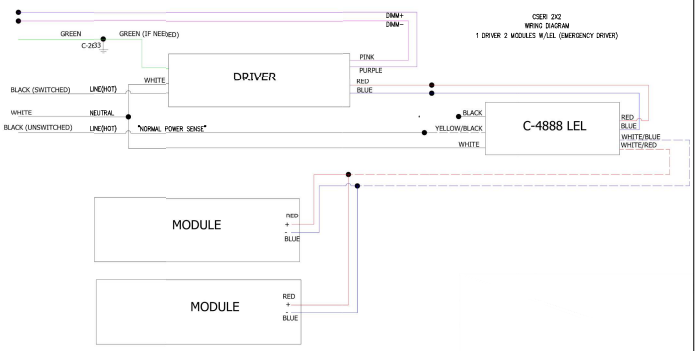
LMRC-212 Dual Relay Wiring Diagram

3 DLM TYP. WIRING, FIXTURE "A/AE" SIM. FOR LMRC-212 SCALE : N.T.S.

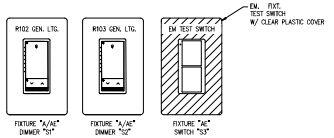


4 LASER TABLE GROUNDING DETAIL SCALE : N.T.S.



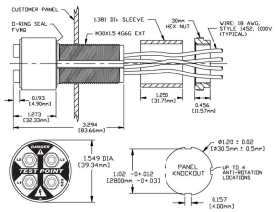


1 FIXTURE "A/AE" WIRING DIAGRAM SCALE : N.T.S.



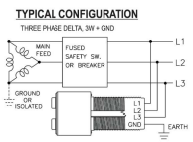
2 LTG. CONTROL SWITCHES SCALE : N.T.S.

Figure 1



Note: (4) Test point jacks accept .080" DIA. probe points.

Figure 2



Note: Use abrasion and cut resistant wire sleeves to route the device leads to protect against mechanical damage resulting from sharp edges and door hinges.

5 VOLTAGE TESTER, GRACE SAFE-TEST POINT SCALE : N.T.S.

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DES	RODRIGUEZ, HUGO	DATE	
CHKR	ORTIZ, JUSTIN	DATE	
APPROVALS	CHAMBERLAIN, JOEL	DATE	

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DRAWING NUMBER: B0999-E05-0145 | REVISION: F | E

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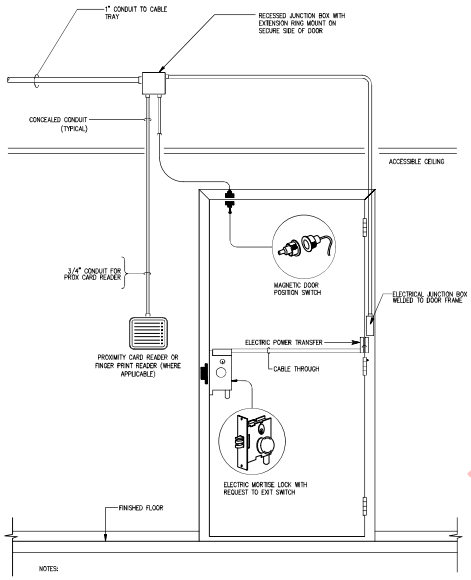
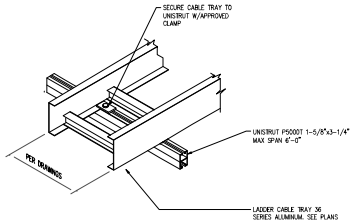
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

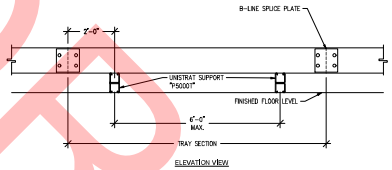


NOTES:
1. THIS DETAIL IS DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DOOR HARDWARE SCHEDULES FOR EXACT DOOR CONFIGURATION. REFER TO SECURITY FLOOR PLANS FOR EXACT LOCATION.
2. CONTRACTOR SHALL INSTALL CONDUIT INFRASTRUCTURE AND BACK BOXES, AND PROVIDE 120V CIRCUIT WHERE REQUIRED FOR DOOR CONTROL AND LASER SAFETY SYSTEMS.

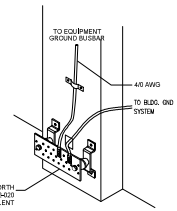
7 TYP. SINGLE DOOR W/ ACCESS CONTROL SCALE : N.T.S.



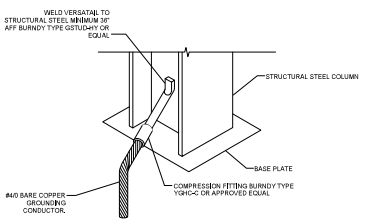
4 LADDER CABLE TRAY FASTENING SCALE : N.T.S.



5 UNDER LASER LADDER CABLE TRAY SUPPORT SCALE : N.T.S.

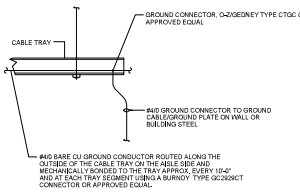


1 BLDG. GROUNDING BUS BAR SCALE : N.T.S.

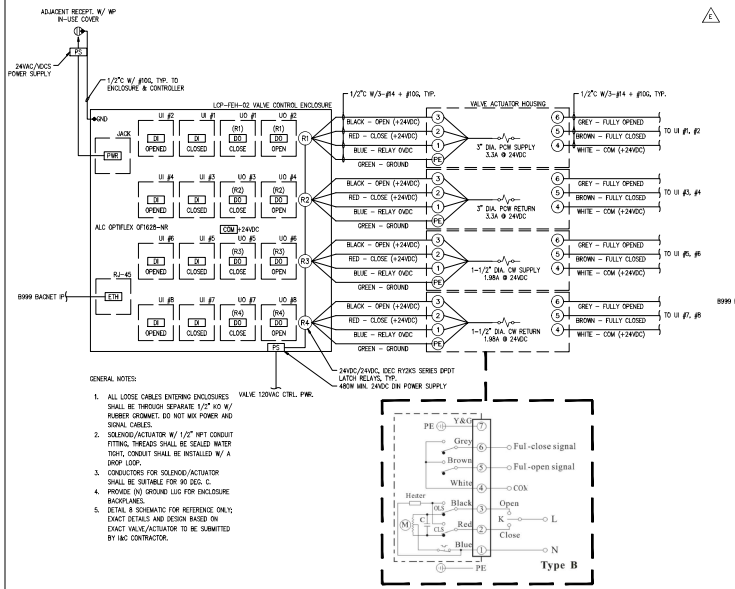


* FOR ABOVE SLAB BUILDING GROUNDING ROTATED 180°.

2 GROUNDING PIGTAIL TO STEEL CONNECTION SCALE : N.T.S.

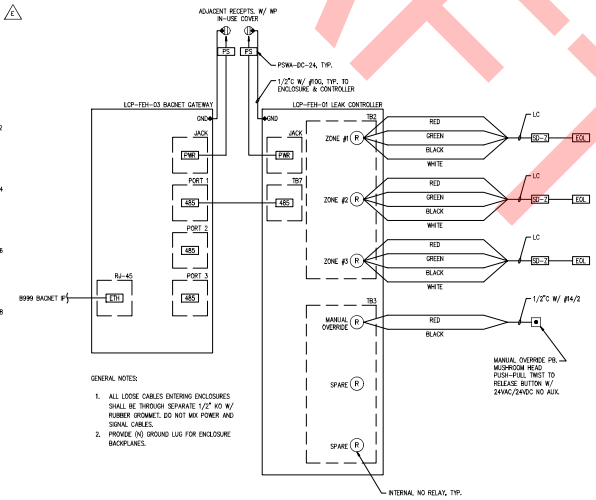


3 CABLE TRAY GROUNDING DETAIL SCALE : N.T.S.



GENERAL NOTES:
1. ALL LOOSE CABLES ENTERING ENCLOSURES SHALL BE THROUGH SEPARATE 1/2" KO W/ RUBBER GROMMET. DO NOT MIX POWER AND SIGNAL CABLES.
2. SOLENOID/ACTUATOR W/ 1/2" NPT CONDUIT FITTING, THREADS SHALL BE SEALED WATER TIGHT, CONDUIT SHALL BE INSTALLED W/ A DROP LOOP.
3. CONDUCTORS FOR SOLENOID/ACTUATOR SHALL BE SUITABLE FOR 90 DEG. C.
4. PROVIDE (N) GROUND LUG FOR ENCLOSURE BACKPLANES.
5. DETAIL 8 SCHEMATIC FOR REFERENCE ONLY; EXACT DETAILS AND DESIGN BASED ON EXACT VALVE/ACTUATOR TO BE SUBMITTED BY M/C CONTRACTOR.

8 LCP-FEH-02 VALVE CONTROL ENCLOSURE WIRING DIAGRAM SCALE : N.T.S.



GENERAL NOTES:
1. ALL LOOSE CABLES ENTERING ENCLOSURES SHALL BE THROUGH SEPARATE 1/2" KO W/ RUBBER GROMMET. DO NOT MIX POWER AND SIGNAL CABLES.
2. PROVIDE (N) GROUND LUG FOR ENCLOSURE BACKPLANES.

6 LCP-FEH_03 BACNET GATEWAY AND LCP-FEH-01 LEAK CONTROLLER ENCLOSURES WIRING DIAGRAM SCALE : N.T.S.

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Construction Authorization (FC)
BY:
DATE:
Revised Authorization: Yes / No
These plans have been reviewed for compliance with SLAC requirements and are approved for construction.
Any subsequent changes shall be reviewed and approved by the BIO prior to the changes being made in the field.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

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DES	RODRIGUEZ, HVAC	05-18-2026
CHKR	ORTIZ, JUSTIN	05-18-2026

APPROVALS — DATE
DAGHIGHIAN, BILL — 05-19-2026

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DRAWING NUMBER: B0999-E05-0146 | REVISION: F | E

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REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	OT	JO	SK	12-02-2025
B	60% CD	HF	JO	SK	12-16-2025
C	90% CD	HF	JO	SK	01-06-2026
D	100% CD	HF	JO	SK	03-31-2026
E	F&O AND BIO REVIEW	HF	JO	SK	05-01-2026
F	F&O AND BIO REVIEW	HF	JO	SK	05-18-2026

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

This document is used to demonstrate compliance with requirements in §110.9, §110.12(c), §130.0, §130.1, §140.6 and §141.0(b)2 for indoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in §160.5, §170.2(d) and §180.2(b)4 for indoor lighting scopes using the prescriptive path for multifamily occupancies. Multifamily includes dormitory and senior living facilities.

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 1 of 8)**
Project Address:		**Date Prepared:**	2026-03-06T13:48:47-05:00

A. GENERAL INFORMATION

01	Project Location (city)	MENLO PARK	04 Total Conditioned Floor krea (ft²)	486.5
02	Climate Zone		05 Total Unconditioned Floor Area (ft²)	0
03	Occupancy Types Within Project (select all that apply):		06 # of Stories (Habitable Above Grade)	0

● Commercial Industrial

B. PROJECT SCOPE

This table includes any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.6 / §170.2(e) or §141.0(b)2 / §180.2(b)4 alterations.

Scope of Work	Conditioned Spaces		Unconditioned Spaces	
01	02	03	04	05
My Project Consists of (check all that apply):	Calculation Method	Area (ft²)	Calculation Method	Area (ft²)
☐ New Lighting System	N/A	0	N/A	0
☐ New Lighting System - Parking Garage	N/A	0	N/A	0
☒ Altered Lighting System	Area Category Method	486.5	Area Category Method	0
Total Area of Work (ft²)	486.5			

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 2 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

C. COMPLIANCE RESULT

If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per §140.6(b)1 /§170.2(e)	Allowed Lighting Power per §140.6(b) /§170.2(e) (Watts)					Adjusted Lighting Power per §140.6(a) /§170.2(e) (Watts				Compliance Results
	01	02	03	04		05	06	07		08
	Complete building §100.6(c)1	Area Category §140.6(c)2 /§170.2(e)4	Area Category Additional §140.6(c)2G / §170.2(e)4Aiv	Total Allowed (Watts)		Total Designed (Watts)	PAF Lighting Control Credit §140.6(a)2 /§170.2(e)1B (-)		Total Adjusted (Watts) *Includes Adjustments	
	(See Table I)	(See Table I)	(See Table J)			(See Table F)	(See Table P)			
Conditioned		413.53	340.55	754.08	:	737		=	737	COMPLIES
Unconditioned					:		0	=		
Controls Compliance (See Table H for Details)										COMPLIES
One-for-one Luminaire Alterations Compliance (See Table Q for Details)										

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with user-editable comments because a) selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 3 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

F. INDOOR LIGHTING FIXTURE SCHEDULE

This table includes all planned permanent and portable lighting other than dwelling unit/ hotel/ motel room lighting. Multifamily dwelling unit and hotel/motel room lighting is documented in Table T. If using Table T to document lighting in multifamily common use areas providing shared provisions for living, eating, cooking or sanitation, those luminaires are not included here.

Designed Wattage: Conditioned Spaces

01	02	03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description	Included (Track) Fixture	Small Aperture & Color Change[1]	Watts per luminaire[2]	How is Wattage determined	Total Number of Luminaires	Excluded per §140.6(a)3 / §170.2(e)2C	Design Watts	Field Inspection	
									Pass	Fail
A	2'x2' RECESSED INTO 1" SUSPENDEDT-BAR CEILING , 90 CRI, 4000K	No	NA	67	Mfr. Spec	7	No	469	☐	☐
AE	2'x2' RECESSED INTO 1" SUSPENDEDT-BAR CEILING , 90 CRI, 4000K W/LUI624 DRIVER, RELAY AND BATTERY	No	NA	67	Mfr. Spec	4	No	268	☐	☐
					Total Designed Watts: CONDITIONED SPACES			737		

[1]FOOTNOTE: Design Watts for small aperture and color changing luminaires which qualify per §140.6(a)4B /§170.2(e)2D is adjusted to be 75% /80% of their rated wattage. Table F automatically makes this adustment, the permit applicant should enter full rated wattage inoslumn 05.

[2]Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for amplance per §130.0(c) /§160.5b). Wattage used must be the maximum rated for the luminaire, not the lamp.

G. MODULAR LIGHTING JYSTEMS

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 4 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

H. INDOOR LIGHTING CONTROLS (Not including PAFs)

This table includes lighting controls for conditioned and unconditioned spaces.

Building Level Controls

01	02	03	
		Field Inspector	
		Pass	Fail
Mandatory Demand Response §110.12(c	Shut-off controls §130.1(c / §160.5(b)4C	☐	☐
NA = 4,000W subject to multilevel	See Area/Space Level Controls (Column B)		

Area Level Controls

04	05	06	07	08	09	10	11	12	
Area Description	Complete Building or Area Category Primary Function's Area	Manual Controls §130.1(a) /§160.5(b)4A	Multi-Level Controls §130.1(b) /§160.5(b.4B	Shut-Off Controls §130.1(c) //§160.5(b)4C	Primary/Sky n Daylighting §131.1(d) /§104.5(b)4C)	Secondary Daylighting §130.1(d) /§160.5)b4 D	Interlocked Systems §140.4(a)1/ §170.2(e)2 A	Field Inspector	
								Pass	Fail
R103	General Commercial Industrial Work Area Precision	Auth. Personnel	Dimme	NA: 24 hour/365 day	NA Not dayli zone	NA: Not dayli zone	No	☐	☐
R102	General Commercial Industrial Work Area Precision	Auth. Personnel	Dimme	NA: 24 hour/365 day	NA Not dayli zone	NA: Not dayli zone	No	☐	☐
							13		
							main sheet showing unwire zones:		

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Each area complying ing the Complete Building or Area Category Methods per §140.6(b) are included in this table. Column 06 indicates if additional lighting power allowances per §140.6(c) or adjustments per §140.6(a) are being used .

Conditioned Spaces

01	02	03	04	05	06

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 5 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft²)	Area (ft²)	Allowed Wattage (Watts)	Additional Allowance / Adjustment	
					Area Category/PAF	PAF
R102	General Commercial Industrial Work Area Precision	0.85	43.5	36.98	Yes	No
R103	General Commercial Industrial Work Area Precision	0.85	443	376.55	Yes	No
		TOTALS:	486.5	413.53	See Tables J, or P for detail	

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 6 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

J. ADDITIONAL ALLOWANCE: AREA CATEGORY METHOD QUALIFYING LIGHTING SYSTEM

All areas indicated in Table .as using an additional allowance using the Area Category Method have been included in this tabl- to calculate the additional allowance per Table 140.6-C /170.2-M

Conditioned Spaces

01	02	03	04	05	06	07		08	09	10
Area Description	Primary Function Area	Applicable Qualifying Lighting System from Table 140.6-C	Allowed Density (W/ft² or W/ft² x W/unit)	Ltg Area, Length or ATM/Mirror (ft², lf or #)	Extra Allowance (Watts)	Luminaire Name or Item Tag		Watts per Luminaire	Number of Luminaires	Total Design Watts
R102	General Commercial Industrial Work Area Precision	Precision work	0.7	43.5	30.45	AE		67	1	67
Total Design Watts	Calculated Allowance (Watts):	Total Additional Allowance for this area:								
67	30.45	30.45								
R103	General Commercial Industrial Work Area Precision	Precision work	0.7	443	310.1	A		67	7	469
						AE		67	3	201
Total Design Watts	Calculated Allowance (Watts):	Total Additional Allowance for this area:								
670	310.1	310.1								
		11								
Total Additional Allowance (Watts) CONDITIONED SPACES		340.55								

P. POWER ADJUSTMENT LIGHTING CONTROL CREDIT (POWER ADJUSTMENT FACTOR (PAF))

This section does not apply to this project.

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 7 of 8)**
		Date Prepared:	2026-03-06T13:48:47-05:00

Q. ONE-FOR-ONE LUMINAIRE ALTERATIONS

This section does not apply to this project.

R. 80% LIGHTING POWER FOR ALL ALTERATIONS - CONTROLS EXCEPTIONS

This section does not apply to this project.

S. DAYLIGHT DESIGN POWER ADJUSTMENT FACTOR (PAF)

This section does not apply to this project.

T. DWELLING UNIT LIGHTING

This section does not apply to this project.

U. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRLI-LTI-E - Must be submitted for all buildings

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no NRCA forms required for this project.

STATE OF CALIFORNIA
Indoor Lighting CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-LTI-E

Project Name:	DCS2025-O96-OPTICS-LAB	**Report Page:**	**(Page 8 of 8)**
Project Address:	2075 SANDHILL ROAD, MELO PARK, CA 94026-7015	**Date Prepared:**	2026-03-06T13:48:47-05:00

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	HUGO FERNANDEZ	Documentation Author Signature:	
Company:	VEKTOR ENGINEERING AND CONSULTING SERVICES, INC.	Signature Date:	12/01/2025
Address:	2603 CAMINO RAMON SUITE 417	CEA/ATA/ITC Certification Identification if applicable):	
City/State/Zip:	SAN RAMON, CA 94583	Phone:	8668386671

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provived on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on his Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured device for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and 'art 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided in other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Person Name:	SERGEY KOROLEV, P.E.	Responsible Person Signature:	
Responsible Person Scope:			
Company:	VEKTOR ENGINEERING AND CONSULTING SERVICES, INC.	Date Signed:	03/06/2026
Address:	280 CAMINO RAMON SUITE 417	License:	CA E20491
City/State/Zip:	SAN RAMON, CA 94583	Phone:	(866) 835-8671

DRAFT

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC supplied permit/plan comps
Construction Authorization (AFC)
BY: Hardy
DATE: 10/1/2026 FROM: Dan Ca
Revised Authorization ☒ No ☐ Yes
This Construction Authorization is granted subject to the terms and conditions of the Agreement between the Department of Energy and Stanford University for the management and operation of the SLAC National Accelerator Laboratory.
Please contact Stanford Land Use Planning to obtain any permits or approvals required by local, municipal, or other authorities.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

Vektor Engineering & Consulting Services, Inc.
"Where engineering and technology drive innovation"
2603 Camino Ramon, Suite 417
San Ramon, CA 94583
+1 (866) VEKTOR1 (835-8671)

REGISTERED PROFESSIONAL ENGINEER SERGEY V. KOROLEV 22068 ELECTRICAL STATE OF CALIFORNIA

SCALE: AS NOTED	DO NOT SCALE DRAWING	B0999.2025.04	E7.01

SLAC NATIONAL ACCELERATOR LABORATORY | U.S. DEPARTMENT OF ENERGY

THE DRAWINGS, SPECIFICATIONS AND OTHER DATA HEREIN PROVIDED SHALL NOT BE COPIED, PUBLISHED OR OTHERWISE FURTHER DISSEMINATED WITHOUT PRIOR WRITTEN PERMISSION OF STANFORD UNIVERSITY / SLAC.

ENGR	KOROLEV, SERGEY	DATE	05-18-2026
DES	FERNANDEZ, HUGO	DATE	05-18-2026
CHKR	ORTIZ, JUSTIN	DATE	05-18-2026

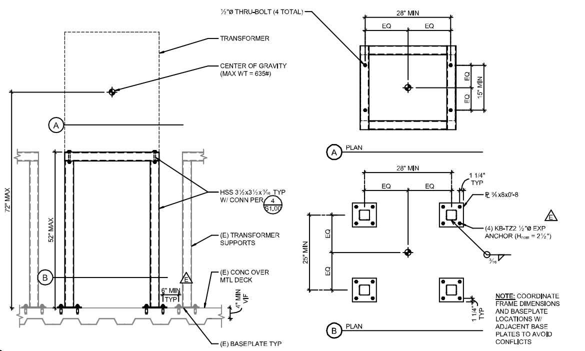
APPROVALS DATE
DRAWING NUMBER B0999-E00-0147 REVISION F E

B0999 OPTICS LAB DESIGN ELECTRICAL ENERGY COMPLIANCE

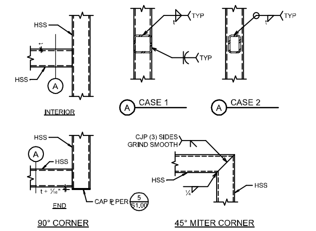
B0999-E00-0147 - F E

REV	DESCRIPTION	DRN	CHK	APP	DATE
F	FAO & BIO REVIEW	LS	RSB		05-18-2026

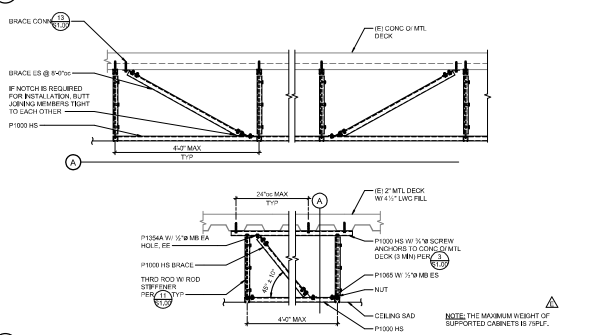
REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	LS	RSB		12-02-2025
B	60% CD	DJM	RSB		12-16-2025
C	90% CD	DJM	RSB		01-06-2026
D	100% CD	DJM	RSB		02-04-2026
E	FAO & BIO REVIEW	DJM	RSB		04-28-2026



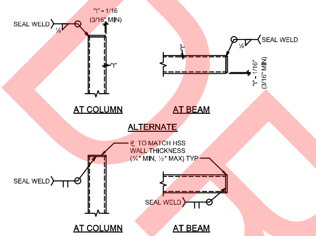
8 TRANSFORMER FRAME SUPPORT
3/4" = 1'-0"



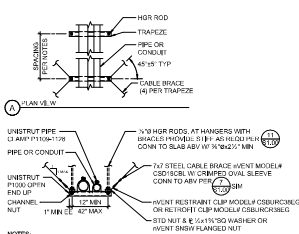
4 TYPICAL HSS TO HSS CONNECTION
3/4" = 1'-0"



9 RAIL AND BRACE CONNECTION AT DECK
3/4" = 1'-0"

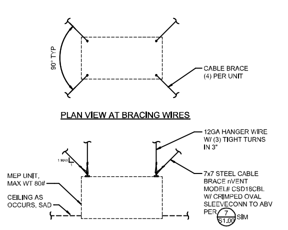


5 TYPICAL CAP PLATE
3/4" = 1'-0"



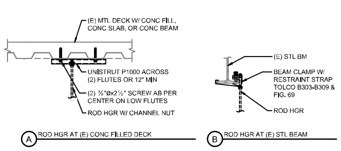
NOTES:
1. ALL nVENT PRODUCTS ARE PER ESR-4567.
2. OVAL CLIPS ARE nVENT MODEL# CSBxxSLVB AND SHALL BE SIZED TO MATCH THE CABLE SIZE.
3. MAX TRAPEZE SPACING IS 8'-0"oc, MAX BRACE SPACING IS 24'-0"oc
4. THE MAXIMUM WEIGHT OF SUPPORTED CONDUITS IS 21PLF.
5. CABLE BRACES ARE NOT REQUIRED PER CBC1617A.1.24 WHERE THE TOTAL WEIGHT SUPPORTED BY A TRAPEZE IS ≤100# & HANGERS ARE ≤12" LONG.

12 PIPE OR CONDUIT TRAPEZE SUPPORT
3/4" = 1'-0"



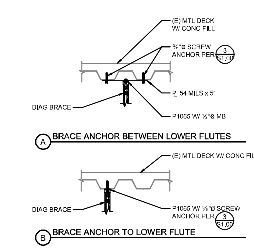
NOTES:
1. ALL nVENT PRODUCTS ARE PER ESR-4567.
2. SEE MECHANICAL DRAWINGS FOR MORE INFORMATION.
3. CONTRACTOR TO COORDINATE ROD AND BRACING LOCATIONS WITH (E) UTILITIES PRIOR TO INSTALLATION.

10 FAN FILTER UNIT SUPPORT
3/4" = 1'-0"

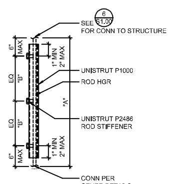


NOTES:
1. MAXIMUM LOAD PER HANGER = 200#
2. MINIMUM SPACING BETWEEN HANGERS IS 6-0"oc IN BOTH DIRECTIONS UNLESS THE TOTAL LOAD SUPPORTED BY CLOSELY SPACED HANGERS IS LESS THAN THE MAXIMUM.
3. THREADED ROD HANGERS ARE ⅜"Ø MIN BUT NOT LESS THAN PER SPECIFYING DRAWINGS.

6 ROD HANGER ANCHORAGE
3/4" = 1'-0"



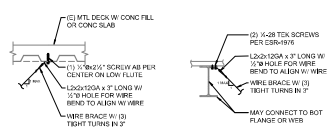
13 UNISTRUT BRACE ANCHORAGE
3/4" = 1'-0"



ROD STIFFENER REQUIREMENTS		
ROD SIZE	MAX ROD LENGTH WITHOUT STIFFENERS "A"	MAX SPACING BETWEEN STIFFENERS "B"
⅜"Ø	19"	13"
½"Ø	25"	18"

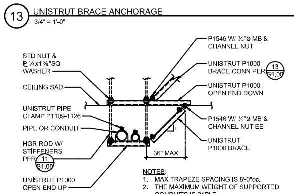
NOTES:
1. ROD STIFFENERS ARE REQUIRED AT ALL HANGERS ATTACHED TO OR ADJACENT TO SEISMIC BRACING.
2. INSTALL MIN (2) ROD STIFFENERES.

11 ROD HANGER STIFFENERS
1 1/2" = 1'-0"



NOTES:
1. MAXIMUM AXIAL LOAD PER BRACE = 50#
2. MINIMUM SPACING BETWEEN BRACES OR BETWEEN A BRACE AND HANGER IS 48"oc IN BOTH DIRECTIONS.
3. WIRE BRACES ARE 10GA MIN BUT NOT LESS THAN PER SPECIFYING DRAWINGS.

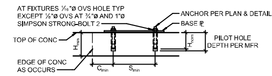
7 WIRE BRACE ANCHORAGE
3/4" = 1'-0"



NOTES:
1. MAX TRAPEZE SPACING IS 8'-0"oc.
2. THE MAXIMUM WEIGHT OF SUPPORTED CONDUITS IS 21PLF.

14 TRAPEZE SUPPORT AT CEILING
3/4" = 1'-0"

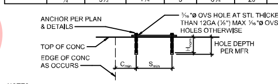
CARBON STEEL EXPANSION ANCHORS IN 2500 PSI MIN CONC						
ANCHOR TYPE	ANCHOR & PILOT HOLE DIA	MIN NOMINAL EMBED H_{nom}	MIN EDGE DISTANCE C_{min}	MIN SPCG S_{min}	MIN CONC THICKNESS H_{min}	INSTALL & TEST TORQUE (FT-LB)
HILTI KB-TZ2 (ICC-ESR 4266)	⅜"	1⅞"	5"	8"	3¼"	30
	½"	2½"	2¾"	5½"	4"	50
	⅝"	3¼"	4½"	6½"	5"	40
	¾"	4"	5"	10"	5½"	110



NOTES:
1. EXCEPT AT EXTERIOR EXPOSURE CONDITIONS, PROVIDE CARBON STEEL ANCHORS UNO. INSTALL EXPANSION ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 AND THE REQUIREMENTS OF THE ICC REPORTS.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. NO CORE DRILLING PERMITTED. USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND TIGHTENING TORQUE.

1 EXPANSION ANCHOR IN CONCRETE
3/4" = 1'-0"

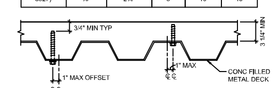
CARBON SCREW ANCHOR IN 2500 PSI MIN CONCRETE							
ANCHOR TYPE	ANCHOR AND PILOT HOLE DIA	MINIMUM EMBEDMENT H_{nom}	MINIMUM EDGE DIST C_{min}	MINIMUM SPCG S_{min}	MINIMUM CONCRETE THICKNESS H_{min}	INSTALL & TEST TORQUE (FT-LB)	MAXIMUM INSTALL TORQUE (FT-LB)
SIMPSON TITEN HD (ICC-ESR 2713)	¼"	1⅝"	1½"	1½"	3¼"	10	24
	⅜"	2½"	1¾"	3"	4"	10	50
	½"	3¼"	1¾"	3"	5"	10	65
	⅝"	4"	1¾"	3"	6"	10	100
	¾"	5½"	1¾"	3"	8¾"	20	150
HILTI KH-EZ (ICC-ESR 3027)	¼"	1⅝"	1½"	3"	3¼"	10	18
	⅜"	2½"	1½"	3"	4"	10	40
	½"	3"	1¾"	3"	4¾"	10	45
	⅝"	3¼"	1¾"	4"	5"	10	85
	¾"	4"	1¾"	4"	6"	20	95
STAINLESS STEEL SCREW ANCHOR IN 2500 PSI MIN CONCRETE							
SIMPSON TITEN HDSS (IAPMO UES ER-493)	⅜"	2½"	1¾"	3"	4"	10	40
	½"	3¼"	1¾"	4"	5"	10	70
	⅝"	4"	1¾"	3"	6"	10	85
	¾"	5½"	1¾"	3"	8¾"	20	150



NOTES:
1. EXCEPT AT EXTERIOR EXPOSURE CONDITIONS, PROVIDE CARBON STEEL ANCHORS UNO. INSTALL SCREW ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 OF THE CBC AND THE REQUIREMENTS OF THE ICC REPORTS. INSTALLED ANCHORS SHALL BRING CONNECTED PLIES INTO FIRM CONTACT, MEETING THE INSTALL TORQUE BUT NOT EXCEEDING THE MAXIMUM INSTALL TORQUE.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. HOLES TO BE DRILLED W/ ROTARY DRILL ONLY. WHEN INSTALLING DRILLED-IN ANCHORS IN EXISTING REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND TIGHTENING TORQUE.

2 SCREW ANCHOR IN CONCRETE
3/4" = 1'-0"

SCREW ANCHOR IN 2500 PSI MIN CONCRETE					
ANCHOR TYPE	ANCHOR AND PILOT HOLE DIA	MINIMUM EMBEDMENT H_{nom}	MINIMUM SPCG S_{min}	MINIMUM INSTALL TORQUE (FT-LB)	MAXIMUM INSTALL TORQUE (FT-LB)
SIMPSON TITEN HD (ICC-ESR 2713)	¼"	1⅝"	1½"	10	24
	⅜"	1⅝"	3"	10	50
HILTI KH-EZ (ICC-ESR 3027)	¼"	1⅝"	1½"	10	18
	⅜"	2⅛"	3"	10	40



NOTES:
1. INSTALL SCREW ANCHORS PER MANUFACTURER'S INFORMATION AND ICC REPORT INSTRUCTIONS. SPECIAL INSPECTION IS REQUIRED PER SECTION 1705 OF THE CBC AND THE REQUIREMENTS OF THE ICC REPORTS. INSTALLED ANCHORS SHALL BRING CONNECTED PLIES INTO FIRM CONTACT, MEETING THE INSTALL TORQUE BUT NOT EXCEEDING THE MAXIMUM INSTALL TORQUE.
2. CONTRACTOR TO VERIFY MINIMUM EDGE DISTANCES, SPACING AND THICKNESS ARE IN ACCORDANCE W/ SCHEDULE PRIOR TO INSTALLING ANCHOR.
3. HOLES TO BE DRILLED W/ ROTARY DRILL ONLY. WHEN INSTALLING DRILLED-IN ANCHORS IN EXISTING REINFORCED CONCRETE, USE CARE AND CAUTION TO AVOID CUTTING OR DAMAGING THE EXISTING REINFORCING BARS. MAINTAIN 1" CLEARANCE BETWEEN REINFORCEMENT AND THE DRILLED-IN ANCHOR. FILL ABANDONED HOLES W/ HIGH STRENGTH GROUT.
4. THE SPECIAL INSPECTOR SHALL PERFORM PERIODIC/CONTINUOUS INSPECTION IN ACCORDANCE WITH TABLE 1705.3. THE SPECIAL INSPECTOR SHALL INSPECT ANCHOR TYPE, ANCHOR DIMENSIONS, HOLE CLEANLINESS, EMBEDMENT DEPTH, CONCRETE TYPE, CONCRETE COMPRESSIVE STRENGTH, DRILL BIT DIAMETER, HOLE DEPTH, EDGE DISTANCE(S), ANCHOR SPACING(S), CONCRETE THICKNESS, AND TIGHTENING TORQUE.

3 SCREW ANCHOR TO BOTTOM OF DECK
1 1/2" = 1'-0"

E STRUCTURAL SPECIFICATIONS

STRUCTURAL STEEL
1. STEEL GRADES:
PLATES.. ASTM A36, A572 GRADE 50 OR A529 GRADE 50 UNO
SQUARE AND RECTANGULAR HSS .... ASTM A500 GRADE C
MACHINE BOLTS (MB) .... ASTM A307 GRADE A
MACHINE BOLT NUTS................................ ASTM A563 GRADE A
MACHINE BOLT WASHERS.......................... ASTM F844
2. WORKMANSHIP AND DETAILS SHALL CONFORM TO THE AISC SPECIFICATIONS AND THE CBC UNLESS NOTED OTHERWISE.
3. BOLT HOLES SHALL BE ¹⁄₁₆" LARGER IN DIAMETER THAN THE BOLT. ANCHOR BOLT HOLES SHALL BE ⅛" LARGER IN DIAMETER THAN THE ANCHOR BOLT.
4. WELDING ELECTRODES SHALL MEET AWS REQUIREMENTS AND ELECTRODES SHALL BE E70XX FOR SHIELDED METAL ARC, F7XX-EXXX FOR SUBMERGED ARC (SHOP WELDS ONLY), ER70S-X FOR GAS METAL ARC AND E7XT-XX FOR FLUX CORE (UNLESS NOTED OTHERWISE). E60 OR E70 ELECTRODES MAY BE USED AT METAL DECK AND LIGHT GAUGE METAL.
5. ALL STRUCTURAL WELDS SHALL BE INSPECTED AND CERTIFIED BY A QUALIFIED TESTING AGENCY. CERTIFICATION SHALL BE SUBMITTED TO THE ARCHITECT AND THE BUILDING DEPARTMENT.
6. SEE ARCHITECTURAL DRAWINGS FOR FINISHES ON STEEL FRAMING.

COLD-FORMED STEEL FRAMING
1. YIELD STRENGTHS SHALL BE:
F_y = 33,000 PSI — 33 & 43 MILS (20 & 18 GAUGE)
F_y = 50,000 PSI — 54, 68, & 97 MILS (16, 14, & 12 GAUGE)
2. METAL FRAMING SECTION PROPERTIES (THICKNESS, DIMENSIONS, AREA, SECTION MODULUS, AND MOMENT OR INERTIA) SHALL MATCH THOSE PER AISI D100 UNLESS NOTED OTHERWISE ON DRAWINGS.
3. ALL FRAMING MEMBERS SHALL BE GALVANIZED TO G60 MINIMUM (EQUIVALENT COATING SUCH AS G60s NOT ACCEPTABLE). STUDS AND JOISTS SHALL BE FORMED FROM STEEL THAT CORRESPONDS TO THE MINIMUM REQUIREMENTS OF THE AMERICAN IRON AND STEEL INSTITUTE (AISI) STANDARDS.
4. WELDING ELECTRODES SHALL CONFORM TO AMERICAN WELDING SOCIETY (AWS) STANDARDS INCLUDING AWS A5.18 (GAS METAL ARC.). ELECTRODE STRENGTH SHALL BE E60 OR E70. TOUCH UP ALL WELDS WITH ZINC-RICH PAINT IN COMPLIANCE WITH ASTM A780.
5. METAL SCREWS (MS) OR (SMS) TO BE PAN-HEAD OR HEX-HEAD, SELF-DRILLING OR IN PRE-DRILLED HOLE, OF SIZE AS NOTED ON DRAWINGS, AND OF SUFFICIENT LENGTH TO ACHIEVE FULL PENETRATION INTO ALL MEMBERS AT CONNECTIONS (3 - THREAD PENETRATION MINIMUM BEYOND LAST PLY). MINIMUM EDGE DISTANCE AND SPACING IS 1" IN ALL MEMBERS.
6. STEEL SHEETS USED FOR SHEAR WALL SHEATHING SHALL BE ASTM A1003 GRADE 33 TYPE H.
7. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT THE METAL FRAMING CLIPS, HANGERS, ETC. ARE BY SIMPSON STRONG-TIE. SCREWING SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS WITH A SCREW PROVIDED FOR EACH PUNCHED HOLE UNO.

F COLD-FORMED STEEL FRAMING NOTES

1. SEE PLANS, DETAILS, AND ARCHITECTURAL DRAWINGS FOR METAL FRAMING LOCATIONS. SEE ARCHITECTURAL DRAWINGS FOR WALL WIDTHS AND CONFIGURATIONS.
2. EACH FRAMING MEMBER IS DESIGNATED BY A FOUR PART CODE INDICATING THE SIZE (BOTH DEPTH AND FLANGE WIDTH), STYLE, AND MATERIAL THICKNESS. FOR EXAMPLE, 600S162-54:
600 - MEMBER DEPTH IN 1/100" (6")
S - MEMBER STYLE - S=STUD, T=TRACK
162 - FLANGE WIDTH IN 1/100" (1⅝")
54 - MATERIAL THICKNESS IN MILS (0.054")
3. TYPICAL METAL STUDS AND FRAMING ARE PER SCHEDULE 1/S1.01 UNO. SUBMIT SHOP AND ERECTION DRAWINGS AND MANUFACTURER'S INFORMATION SHOWING CONFORMANCE TO CRITERIA SHOWN ON DRAWINGS AND SPECIFICATIONS. MINIMUM METAL THICKNESS = 33MILS (20GA).
4. TYPICAL TRACKS ARE SAME GAUGE (MILS) AS STUD, 43 MILS MINIMUM UNO. FLANGE TO BE 1½" MIN.
5. ALL STUDS TO BE CONTINUOUS. ALL TRACKS IN HEADERS AND SILLS TO BE CONTINUOUS SINGLE-PIECE BETWEEN JAMB STUDS OR PARAPET POSTS.
6. FASTENING OF COMPONENTS SHALL BE WITH SELF-DRILLING SCREWS OR WELDING. SCREWS OR WELDS NOT SHOWN SHALL BE OF SUFFICIENT SIZE TO ENSURE THE STRENGTH OF THE CONNECTION. ALL WELDS OF GALVANIZED STEEL SHALL BE TOUCHED-UP WITH A ZINC-RICH PAINT. WIRE TYING OF COMPONENTS SHALL NOT BE PERMITTED.
7. EXPANSION ANCHOR OR SCREW ANCHOR SIZE AND EMBEDMENT ARE AS REQUIRED PER DRAWINGS. MINIMUM STEEL EDGE DISTANCE IN TRACK IS 2x ANCHOR DIAMETER AND MINIMUM SPACING IS 3x ANCHOR DIAMETER UNO. SEE EXPANSION OR SCREW ANCHOR SCHEDULE FOR CONCRETE REQUIREMENTS. FOR EXPANSION ANCHOR THROUGH METAL TRACK, USE 3" SQUARE x ¼" PLATE WASHER (OR EQUIVALENT ROUND WASHER) AT TRACK. DRILL HOLE IN PLATE WASHER FOR EXPANSION ANCHOR AS NEEDED TO ACHIEVE MINIMUM EDGE DISTANCES.
8. NON-BEARING STUDS TO BE LATERALLY BRACED WITH GYPSUM BOARD BOTH SIDES PER CBC OR BRACED AT 4'-0"oc MAXIMUM PER 13/S1.01. GYPSUM BOARD MAY NOT BE USED FOR BRACING AT BEARING STUDS.
9. TYPICAL STUD-TO-TRACK CONNECTIONS PER 4/S1.01 UNO. MAXIMUM GAP OF ⅛" IS ALLOWED BETWEEN STUDS AND TRACK AT STANDARD WALLS. TRIM STUDS TO FULLY BEAR.
10. TYPICAL WALL INTERSECTIONS PER 16/S1.01 UNO.
11. PROVIDE LIGHT GAUGE METAL BACKING FOR ARCHITECTURAL FINISHES AND FURNISHINGS SAD.
12. TYPICAL PUNCHOUTS PER 14/S1.01.
13. WALLS AT SEISMIC SEPARATION JOINTS SHALL BE FRAMED AS EXTERIOR WALLS UNO.
14. FOR POWER ACTUATED FASTENERS (PAF) UNO:

BASE MATERIAL	FASTENER TYPE	SIZE	MINIMUM SPACING	MINIMUM EDGE DISTANCE	NOTES
CONCRETE	HILTI X-U (ICC ESR-2269)	0.157"Ø MIN 1¼" LONG	4"	3"	DO NOT USE PAF AT CONCRETE CURB
STRUCTURAL STEEL	HILTI X-U (ICC ESR-2269)	0.157"Øx⅝" LONG	1"	½"	

A DESIGN CRITERIA

DESIGN CRITERIA: 2025 CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2 (CBC)
RISK CATEGORY: II
EARTHQUAKE DATA: MAPPED SPECTRAL RESPONSE ACCELERATIONS: S_S = 2.25; S_1 = 0.82
SITE CLASS: D
SPECTRAL RESPONSE COEFFICIENTS: S_{DS} = 1.80; S_{D1} = NA
SEISMIC DESIGN CATEGORY: E

SCOPE: CONSTRUCTION OF NEW OPTICS LAB, WHICH INCLUDES MODIFICATIONS TO NONSTRUCTURAL PARTITION WALLS AND ANCHORAGE/BRACING OF EQUIPMENT AND DISTRIBUTION SYSTEMS. NO MODIFICATIONS TO THE EXISTING BUILDING STRUCTURE.

B GENERAL NOTES

1. REFER TO SHEETS S1.00 & S1.01 FOR STANDARD DETAILS OF CONSTRUCTION. REFER TO THE PROJECT SPECIFICATIONS FOR MATERIALS AND METHODS.
2. BUILDING DIMENSIONS SHOWN ARE FOR GENERAL REFERENCE ONLY. SEE ARCHITECTURAL DRAWINGS (SAD) FOR ALL ACTUAL BUILDING DIMENSIONS. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER SO CLARIFICATION CAN BE MADE PRIOR TO COMMENCING WORK.
3. STRUCTURAL DRAWINGS SHALL NOT BE SCALED. ALL DIMENSIONS AND FIT SHALL BE DETERMINED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING WORK.
4. DETAILS NOT FULLY OR SPECIFICALLY SHOWN SHALL BE OF SAME NATURE AS OTHER SIMILAR CONDITIONS.
5. REFER TO ARCHITECTURAL DRAWINGS FOR SIDEWALK SLABS AND DIMENSIONS.
6. COORDINATION OF MECHANICAL, ELECTRICAL, PLUMBING, AND SITE UTILITY SYSTEMS WITH THE STRUCTURAL SYSTEM IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. AT CONDITIONS WHERE FIELD MODIFICATIONS OF MECHANICAL, ELECTRICAL, PLUMBING, OR SITE UTILITIES AFFECT STRUCTURAL SYSTEMS, NOTIFY STRUCTURAL ENGINEER PRIOR TO INSTALLATION.
7. VERIFY WEIGHTS AND LOCATIONS OF MECHANICAL UNITS WITH MECHANICAL ENGINEER PRIOR TO PLACEMENT. UNITS EXCEEDING WEIGHT NOTED ON PLANS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO INSTALLATION. CONTRACTOR TO VERIFY MECHANICAL UNIT SIZES AND WEIGHTS AS INSTALLED PRIOR TO INSTALLATION OF ADDITIONAL FRAMING TO ENSURE CORRECT PLACEMENT UNDER CURBS, ETC.
8. SHORING, SCAFFOLDING, AND BRACING DESIGN, MATERIALS AND INSTALLATION SHALL BE PROVIDED BY THE GENERAL CONTRACTOR, AND SHALL BE ADEQUATE FOR ALL LOADS. LEAVE IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY AND UNTIL FINAL STRUCTURAL CONSTRUCTION IS COMPLETED.
9. VEHICULAR TRAFFIC, HEAVY EQUIPMENT AND MATERIAL STAGING SHALL NOT BE ALLOWED ADJACENT TO ANY RETAINING/BASEMENT WALL, NEW OR EXISTING WITHIN A HORIZONTAL DISTANCE EQUAL TO THE WALL HEIGHT MEASURED FROM THE BOTTOM OF FOOTING OR 5'-0" WHICHEVER IS GREATER, UNLESS APPROVED BY THE STRUCTURAL ENGINEER OR NOTED OTHERWISE. WITHIN THIS ZONE, ONLY HAND-OPERATED EQUIPMENT ("WHACKERS", VIBRATORY PLATES, OR PNEUMATIC COMPACTORS) SHALL BE USED TO COMPACT THE BACKFILL SOILS. BACKFILL & DRAINAGE ARE PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. DO NOT BACKFILL UNTIL CONCRETE HAS REACHED SPECIFIED STRENGTH AND 14 DAYS MINIMUM.
10. SPECIAL INSPECTIONS ARE REQUIRED PER D/S1.00 AND THE TESTING AND INSPECTION FORM.
11. STRUCTURAL OBSERVATION PER CBC SECTION 1704.6 IS NOT REQUIRED.

C EXISTING CONSTRUCTION NOTES

1. IN PREPARING THE PROJECT PLANS, THE SOURCE OF INFORMATION WAS BASED ON THE EXISTING BUILDING PLANS PREPARED BY, DGA AND THORNTON TOMASETTI, DATED 11/8/2010. THE CONTRACTOR SHALL VERIFY ALL EXISTING JOB CONDITIONS, REVIEW THE PLANS AND VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF ALL DISCREPANCIES AND EXCEPTIONS BEFORE PROCEEDING WITH ANY WORK.
2. ALL WORK NOT INDICATED AS EXISTING (E) SHALL BE ASSUMED TO BE NEW (N).
3. ANY REMOVAL, CUTTING, DRILLING, ETC OF EXISTING WORK SHALL BE PERFORMED WITH GREAT CARE. SMALL TOOLS SHALL BE USED IN ORDER NOT TO JEOPARDIZE THE STRUCTURAL INTEGRITY OF THE STRUCTURE. IF STRUCTURAL MEMBERS OR MECHANICAL, ELECTRICAL, OR ARCHITECTURAL ELEMENTS NOT INDICATED FOR REMOVAL INTERFERE WITH THE NEW WORK, THE ARCHITECT/ENGINEER SHALL BE IMMEDIATELY NOTIFIED AND PRIOR APPROVAL SHALL BE OBTAINED BEFORE REMOVAL OF THE MEMBERS.
4. DO NOT OVER CUT EXISTING WOOD, CONCRETE, MASONRY OR OTHER WORK TO REMAIN. CUTS SHALL BE MADE NEATLY TO A CORNER, THEN ALTERNATE MEANS SHALL BE USED TO REMOVE REMAINING MATERIAL. CONTRACTOR IS RESPONSIBLE FOR REPAIR/REPLACEMENT OF OVER CUT MATERIAL AS DIRECTED BY THE ARCHITECT AND/OR ENGINEER.
5. EXISTING DAMAGED STRUCTURAL MEMBERS WHICH ARE UNCOVERED SHALL BE REPORTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND REPAIR.
6. EXISTING REINFORCING AND/OR STEEL EMBEDS THAT ARE EXPOSED DURING DEMOLITION SHALL BE WIRE-BRUSHED AND FOREIGN MATERIAL REMOVED PRIOR TO PLACEMENT OF NEW CONCRETE.

D SPECIAL INSPECTION BY OWNERS TESTING AGENCY

SPECIAL INSPECTIONS AND TESTING SHALL BE PERFORMED BY AN APPROVED AGENCY IN ACCORDANCE WITH CBC CHAPTER 17 AND THE STATEMENT OF SPECIAL INSPECTIONS AS REQUIRED BY CBC SECTIONS 1704.2.3 AND 1704.3 FOR BUILDING STRUCTURAL ELEMENTS SUMMARIZED AS FOLLOWS:

1. SPECIAL CASES PER CBC SECTION 1705.1.1 AND PRODUCT ICC REPORTS FOR ALL STRUCTURAL MATERIALS AND SYSTEMS REQUIRED TO BE INSTALLED IN ACCORDANCE WITH ADDITIONAL MANUFACTURER'S INSTRUCTIONS THAT PRESCRIBE REQUIREMENTS NOT CONTAINED IN THE CBC OR REFERENCED STANDARDS INCLUDING POST-INSTALLED ANCHOR BOLTS IN CONCRETE AND CMU, AND PRE-MANUFACTURED SHEAR PANELS AND BRACED FRAMES.

ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
AC	AIR CONDITIONING
ADJ	ADJACENT
ADDL	ADDITIONAL
ALT	ALTERNATE
ALUM	ALUMINUM
ARCH	ARCHITECT
AYC	ALASKAN YELLOW CEDAR
@	AT
BF	BRACED FRAME
BLDG	BUILDING
BLK/BLKG	BLOCK/BLOCKING
BLW	BELOW
BM	BEAM
BN	BOUNDARY NAIL
BOT	BOTTOM
BRG	BEARING
BTWN	BETWEEN
BU	BUILT-UP
BYND	BEYOND
C	AMERICAN STANDARD CHANNEL
CA	CALIFORNIA
CANT	CANTILEVER
CB	CARRIAGE BOLT
CFS	COLD FORMED STEEL
CIP	CAST IN PLACE
CGL	CERTIFIED GLUED LUMBER
CJ	CONTROL JOINT
℄	CENTERLINE
CJP	COMPLETE JOINT PENETRATION
CLG	CEILING
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUOUS
COORD	COORDINATE/COORDINATION
CMU	CONCRETE MASONRY UNIT
CSK	COUNTERSINK
CW	CUT WASHER
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DCW	DEMAND CRITICAL WELD
DF	DOUGLAS FIR
DIA or Ø	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIST	DISTANCE
DJ	DOWEL JOINT
DL	DEAD LOAD
DN	DOWN
DO	DITTO
DWG	DRAWING
DWL	DOWEL
EA	EACH
EE	EACH END
EF	EACH FACE
ELEC	ELECTRICAL
ELEV	ELEVATOR/ELEVATION
EMBED	EMBEDMENT
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
(E)	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FDN	FOUNDATION
FIN	FINISH
FG	FINISH GRADE
FLR	FLOOR
FN	FACE NAIL
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FRMG	FRAMING
FS	FAR SIDE
FTG	FOOTING
GA	GAGE or GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GL	GRIDLINE
GLB	GLUE LAMINATED BEAM
GR	GRADE
HD	HOLDOWN
HDG	HOT-DIP GALVANIZED
HDR	HEADER
HGR	HANGER
HK	HOOK
HORIZ	HORIZONTAL
HSB	HIGH STRENGTH BOLT
HSG	HIGH STRENGTH GROUT
HSH	HORIZONTAL SLOTTED HOLE
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
ID	INSIDE DIAMETER
IJ	I-SHAPED WOOD BUILT UP TRUSS
INT	INTERIOR
JST	JOIST
JT	JOINT
KP	KING POST
L	STEEL ANGLE
Lb or #	POUND(s)
LGMF	LIGHT GAGE METAL FRAMING
LGMFC	LIGHT GAGE METAL FRAMING CONTRACTOR
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LS	LAG SCREW
LSL	LAMINATED STRAND LUMBER
LVL	LAMINATED VENEER LUMBER
LWC	LIGHTWEIGHT CONCRETE
MAX	MAXIMUM
MB	MACHINE BOLT
MBM	METAL BUILDING MANUFACTURER
MC	MISCELLANEOUS CHANNEL
MECH	MECHANICAL
MEZZ	MEZZANINE
MF	MOMENT FRAME
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MIW	MALLEABLE IRON WASHER
MTL	METAL
MU	MECH UNIT
(N)	NEW
NA	NOT APPLICABLE
NO or #	NUMBER
NS	NEAR SIDE
NSG	NON-SHRINK GROUT
NTS	NOT TO SCALE
NWC	NORMAL-WEIGHT CONCRETE
O/	OVER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OVS	OVERSIZED
OW	OTHERWISE
OWT	OPEN WEB TRUSS
℞	PLATE or PROPERTY LINE
PA	POST ABOVE
PAF	POWER ACTUATED FASTENERS
PEN	PANEL EDGE NAIL
PERP	PERPENDICULAR
PES	PANEL EDGE SCREWS
PJP	PARTIAL JOINT PENETRATION
PLF	POUNDS PER LINEAR FOOT
PNL	PANEL
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PTDF	PRESSURE TREATED DOUGLAS FIR
PT	POINT
R	RADIUS
RBS	REDUCED BEAM SECTION
RFTR	RAFTER
REF	REFERENCE
REINF	REINFORCING
REQD	REQUIRED
RET	RETAINING
REV	REVISION
RF	ROOF
RWD	REDWOOD
S	AMERICAN STANDARD BEAM
SAD	SEE ARCHITECTURAL DRAWINGS
SB	SOLID BLOCK
SC	SLIP CRITICAL
SCD	SEE CIVIL DRAWINGS
SCHED	SCHEDULE
SED	SEE ELECTRICAL DRAWINGS
SEOR	STRUCTURAL ENGINEER OF RECORD
SFRS	SEISMIC FORCE RESISTING SYSTEM
SHTG	SHEATHING
SIM	SIMILAR
SKYLT	SKYLIGHT
SLD	SEE LANDSCAPE DRAWINGS
SMS	SHEET METAL SCREW
SMD	SEE MECHANICAL DRAWINGS
SOG	SLAB ON GROUND
SPCG	SPACING
SPD	SEE PLUMBING DRAWINGS
SPEC	SPECIFICATION
SQ	SQUARE
SS	SELECT STRUCTURAL or STAINLESS STEEL
STGR	STAGGERED
STD	STANDARD
STIFF	STIFFENER
STL	STEEL
STRUCT	STRUCTURAL
SW	SHEAR WALL
SYM	SYMMETRICAL
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
THK	THICK
THRD	THREADED
THRU	THROUGH
TL	TOTAL LOAD
TN	TOE NAIL
TO	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FRAMING
TOM	TOP OF MASONRY
TOP	TOP OF PLYWOOD
TOS	TOP OF STEEL
TOT	TOTAL
TU	TILT UP
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
VIF	VERIFY IN FIELD
VSH	VERTICAL SLOTTED HOLE
W	WIDE FLANGE STEEL BEAM
W/	WITH
W/O	WITHOUT
WD	WOOD
WHS	WELDED HEADED STUD
WLD	WELDED
WP	WORK POINT/WATERPROOF
WS	WOOD SCREW
WT	WEIGHT
WTS	WELDED THREADED STUD
WWR	WELDED WIRE REINFORCEMENT

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (IFC)
BY: cnadler
DATE: 5/31/2026 PRS#: 26-18
Revised Authorization ☑ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

ZFA STRUCTURAL ENGINEERS
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san francisco ca 94111
zfa job no. 25649
zfa.com
415.243.4091

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SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04

SLAC NATIONAL ACCELERATOR LABORATORY — U.S. DEPARTMENT OF ENERGY

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		DATE	APPROVALS	DATE
ENGR	BOGART, RYAN	05-18-2026		
DES	MUCK, DALTON	05-18-2026		
CHKR	BOGART, RYAN	05-18-2026		

B999
OPTICS LAB DESIGN
STRUCTURAL
GENERAL NOTES

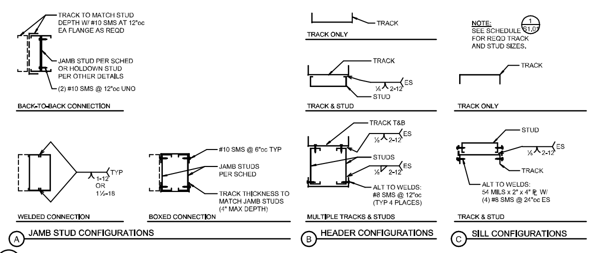
S1.00

DRAWING NUMBER: B0999-S00-0148 | REVISION: F | E

B0999 - S00 - 0148 -F | E

REV	DESCRIPTION	DRN	CHK	APP	DATE
F	FAO & BIO REVIEW	LS	RSB		05-18-2026

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	LS	RSB		12-02-2025
B	60% CD	DJM	RSB		12-16-2025
C	90% CD	DJM	RSB		01-06-2026
D	100% CD	DJM	RSB		02-04-2026
E	FAO & BIO REVIEW	DJM	RSB		04-28-2026

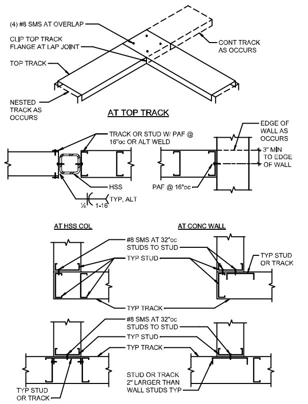


A JAMB STUD CONFIGURATIONS

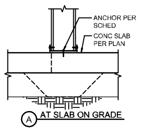
B HEADER CONFIGURATIONS

C SILL CONFIGURATIONS

12 TYPICAL NON-BEARING HEADERS AND SILLS
1 1/2" = 1'-0"



16 TYPICAL CORNERS AND INTERSECTIONS
1" = 1'-0"

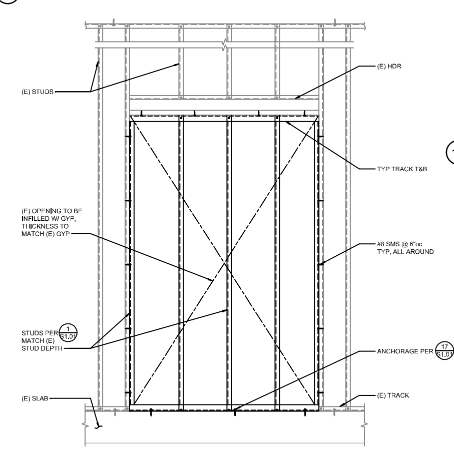


A AT SLAB ON GRADE

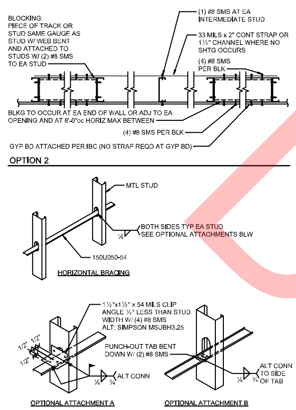
LOCATION	ANCHOR TYPE, DIAMETER AND SPACING			DETAIL
	SCREW ANCHOR	POWER ACTUATED FASTENER	EXPANSION ANCHOR	
INTERIOR WALL SLAB ON GRADE	½"Ø @ 48"oc	0.157"Ø @ 16"oc	½"Ø @ 48"oc	B
MIN CONC EDGE DISTANCE	1¾"	3"	3"	

NOTES:
1. PROVIDE (2) ANCHORS MIN PER TRACK SEGMENT.
2. FOUNDATION AND SLAB REINFORCING PER OTHER DETAILS.
3. CENTER FASTENERS W/ TRACK UNO.
4. SEE PLAN AND SCHEDULE FOR ADDITIONAL ANCHORAGE REQUIREMENTS, AS OCCURS.
5. PROVIDE ANCHOR EACH END OF TRACK. END DISTANCE MIN 1½" AND MAX 3" OR MIN CONCRETE EDGE DISTANCE AS OCCURS.

17 TYPICAL BOTTOM TRACK ANCHORS AT CONCRETE
1" = 1'-0"



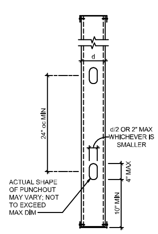
18 DOOR INFILL AT EXISTING WALL
1" = 1'-0"



OPTION 1

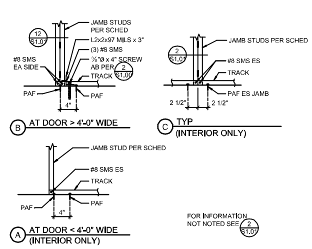
NOTES:
1. BRIDGING MAY BE PER OPTION 1 OR 2.
2. PROVIDE BRIDGING @ 4'-0"oc.
3. BRIDGING IS NOT REQUIRED WHERE PROPERLY ATTACHED SHEATHING (NOT GYP) OCCURS ON BOTH SIDES OF STUDS. GYPSUM SHEATHING MAY BE USED AT NON-BEARING STUDS.
4. 8" MAX STUD DEPTH.
5. PROVIDE BLOCKING PER OPTION 2 AT LOCATIONS INDICATED ON DRAWINGS OR OTHER DETAILS.
6. GENERAL CONTRACTOR TO COORDINATE BRIDGING LOCATIONS WITH MEP.

13 WALL BRIDGING/BLOCKING
1" = 1'-0"



TYP STUD/TRACK PUNCHOUT

14 TYPICAL STUD PUNCHOUT
1" = 1'-0"



B AT DOOR > 4'-0" WIDE

C TYP (INTERIOR ONLY)

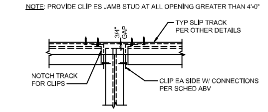
A AT DOOR < 4'-0" WIDE (INTERIOR ONLY)

FOR INFORMATION NOT NOTED SEE 2/S1.01

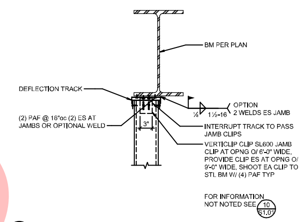
15 JAMB STUD BASE
1" = 1'-0"

CLIP	CONN TO STUD	CONN TO ABV	MIN JAMB STUD THICKNESS	NOTES
SIMPSON SCW	(2) #14 SMS	(2) #12	43 MILS	
STL NETWORK SL CLIP	(3) #12 SMS	(3) #12	43 MILS	
4"x2"x97MILSx4" CLIP W/ ¼"x2" VSH	(2) #12 SMS	(2) #12	43 MILS	

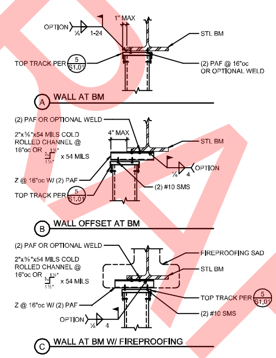
NOTE: PROVIDE CLIP ES JAMB STUD AT ALL OPENING GREATER THAN 4'-0"



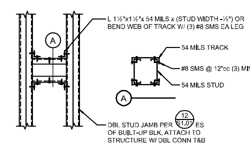
8 JAMB STUD DEFLECTION TRACK
1 1/2" = 1'-0"



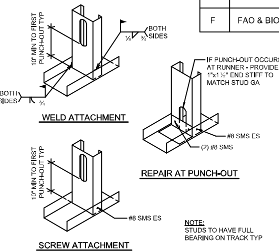
9 ATTACHMENT OF JAMB STUDS TO STEEL BEAM
1" = 1'-0"



10 ATTACHMENT OF NON-BEARING STUDS TO STEEL BEAM
1" = 1'-0"

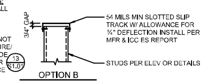


11 HEAVY DUTY WALL BACKING PLATE
1" = 1'-0"

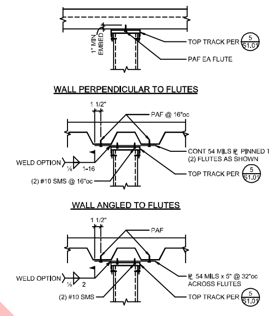


4 STUD OR JOIST TO TRACK
1" = 1'-0"

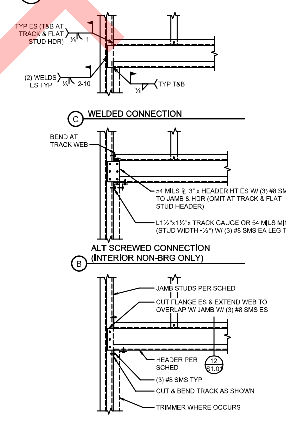
NOTES FOR ALL OPTIONS:
1. WALL COVERING SHALL NOT SCREW TO TOP TRACK.
2. WHERE SHTG DOES NOT EXTEND TO STRUCTURE/ TOP OF WALL, PROVIDE STRAP AND BLKG PER 13/S1.01 AT UNSHEATHED FACE AT 4'-0"oc MAX.



5 NON-BEARING WALL TRACK AT TOP
1" = 1'-0"



6 ATTACHMENT OF NON-BEARING STUDS TO METAL DECK WITH CONCRETE FILL
1" = 1'-0"

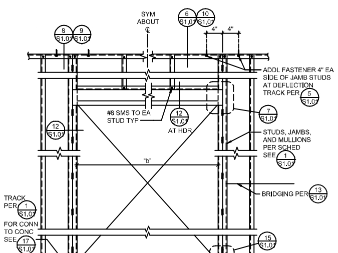


7 TYPICAL HEADER CONNECTION
1" = 1'-0"

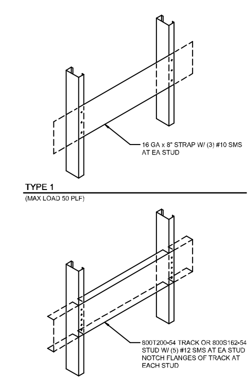
COLD FORMED FRAMING SCHEDULE				
LOCATION	MINIMUM MEMBER SIZE	MAX SPAN/LENGTH	MAX SPACING UNO	REFERENCE DETAIL
INTERIOR STUDS	400S162-43 (OR 600S162-33)	15'-0"	16"oc	
INTERIOR STUDS W/ SHELVING OR EQUIPMENT ANCHORAGE	400S162-54 (OR 600S162-43)	15'-0"	16"oc	
INTERIOR HEADERS	(2) 400S162-33 STUDS AND (2) 400T150-43 TRACKS	b ≤ 8'-0"	[boxed header symbol]	SEE 12/S1.01
	(2) 400S162-33 STUDS AND (2) 600T150-43 TRACKS			
	400T200-68 (OR 600T200-68)	b ≤ 4'-0"	[track symbol]	
INTERIOR JAMBS	(2) 400S162-43 (OR (2) 600S162-33)	15'-0"	b ≤ 8'-0"	SEE 12/S1.01
	400S162-43 (OR 600S162-33)	15'-0"	b ≤ 4'-0"	

1. TYPICAL TRACKS TO BE SAME GAUGE AS STUD, 43 MIL MIN (UNO), FLANGE TO BE 1½" MIN.
2. MULTIPLE ADJACENT WINDOWS TO EACH HAVE INDIVIDUAL HEADERS AND FULL JAMB STUDS BETWEEN WINDOWS.
3. TYP WALL BRIDGING/BLKG PER 13/S1.01
4. TYP STUD/JOIST TO TRACK PER 4/S1.01
5. COORDINATE STUD DEPTH W/ ARCH DRAWINGS, INCREASE MIN HDR, SILL OR JAMB MEMBER DEPTHS AS REQD TO MATCH ACTUAL WALL STUD DEPTH.
6. "b" INDICATES OPENING WIDTH PER 2/S1.01
7. JAMBS TO CONTINUE TO FOUNDATION AT MULTI-STORY CONDITIONS.
8. METAL STUD SECTIONS THAT ARE PART OF BUILT-UP HEADERS SHALL BE UNPUNCHED.

1 SCHEDULE - COLD FORMED METAL FRAMING, UNO
3/4" = 1'-0"



2 INTERIOR NON-BEARING WALL (OPENING AS OCCURS)
1" = 1'-0"



3 WALL BACKING PLATE
1" = 1'-0"

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (IFC)
BY: cnadler
DATE: 5/31/2026 | PRS#: 25-118
Revised Authorization ☑ No ☐ Yes
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

ZFA STRUCTURAL ENGINEERS
601 montgomery street | suite 1450
san francisco ca 94111
zfa job no. 25649
zfa.com
415.243.4091
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SCALE: AS NOTED | DO NOT SCALE DRAWING | B0999.2025.04

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		DATE	APPROVALS	DATE
ENGR	BOGART, RYAN	05-18-2026		
DES	MUCK, DALTON	05-18-2026		
CHKR	BOGART, RYAN	05-18-2026		

B999
OPTICS LAB DESIGN
STRUCTURAL
TYPICAL DETAILS

S1.01

DRAWING NUMBER: B0999-S05-0149
REVISION: F

E

B0999 - S05 - 0149 -F | E

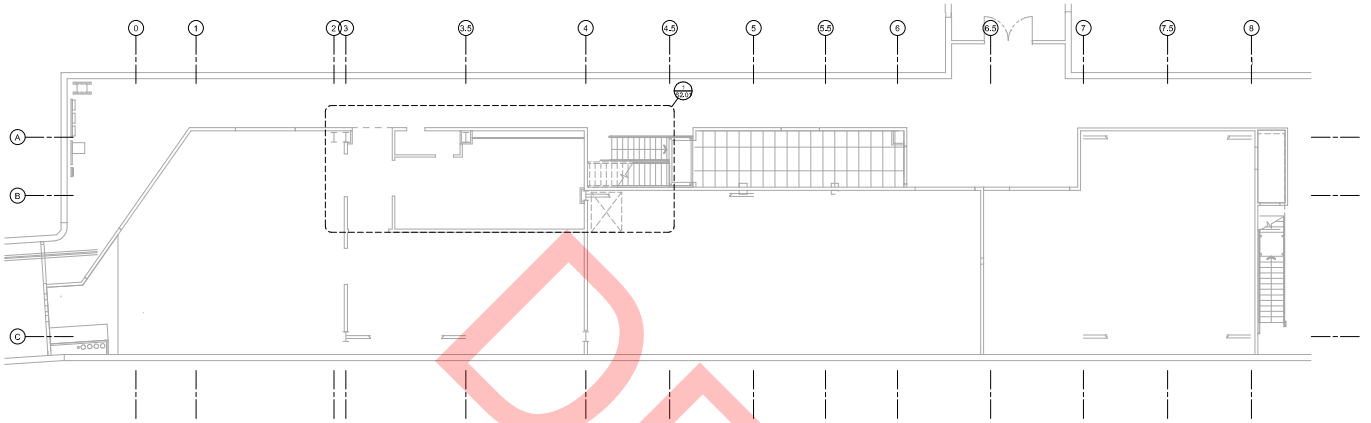
REV	DESCRIPTION	DRN	CHK	APP	DATE
F	FAO & BIO REVIEW	LS	RSB		05-18-2026

REV	DESCRIPTION	DRN	CHK	APP	DATE
A	30% CD	LS	RSB		12-02-2025
B	60% CD	DJM	RSB		12-16-2025
C	90% CD	DJM	RSB		01-06-2026
D	100% CD	DJM	RSB		02-04-2026
E	FAO & BIO REVIEW	DJM	RSB		04-28-2026

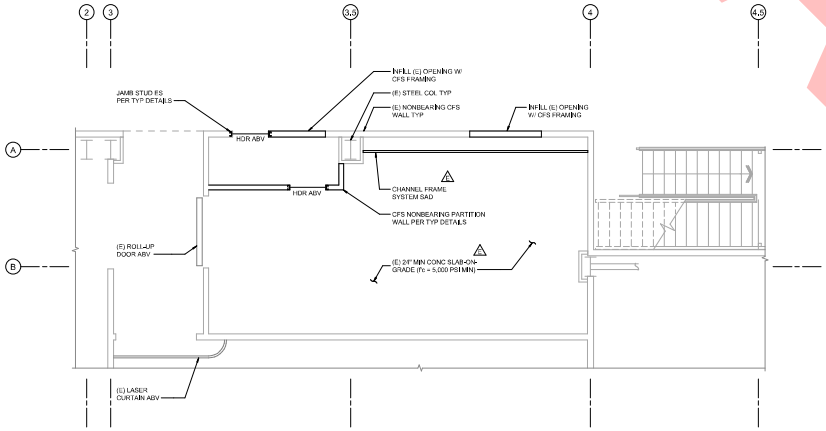
FOUNDATION PLAN NOTES:

1. REFER TO SHEETS S1.00 AND S1.01 FOR GENERAL NOTES AND TYPICAL DETAILS. THE FOLLOWING DETAIL REFERENCES ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE ONLY. ALL GENERAL NOTES AND TYPICAL DETAILS NOTED ABOVE ARE APPLICABLE AND SHALL BE FOLLOWED.
2. COORDINATE ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES.

PLAN LEGEND		
SYMBOL	REFERENCE DETAIL	DESCRIPTION
		INDICATES CONCRETE WALL.
	1/S1.01	INDICATES COLD FORMED STEEL WALL.
		INDICATES STEEL COLUMN.
98		INDICATES GRIDLINE.
101.7		INDICATES ELEVATION.
		INDICATES EXISTING FRAMING.
		INDICATES CONCRETE MASONRY UNIT WALL.



NORTH
FLOOR FRAMNG PLAN
1/8" = 1'-0"



NORTH
1 PARTIAL FLOOR FRAMING PLAN
1/4" = 1'-0"

DRAFT

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

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san francisco ca 94111
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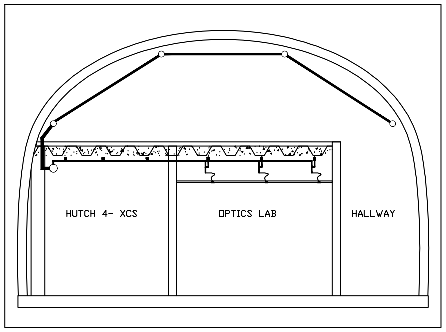
DES	MUCK, DALTON	05-14-2026		
CHKR	BOGART, RYAN	05-14-2026		

B999
OPTICS LAB DESIGN
STRUCTURAL
FLOOR PLANS

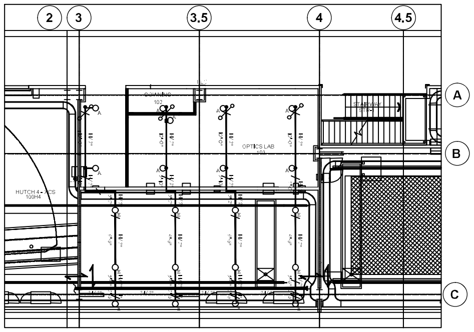
DRAWING NUMBER: B0999-S01-0150 | REVISION: F | E

B0999 - S01 - 0150 -F | E

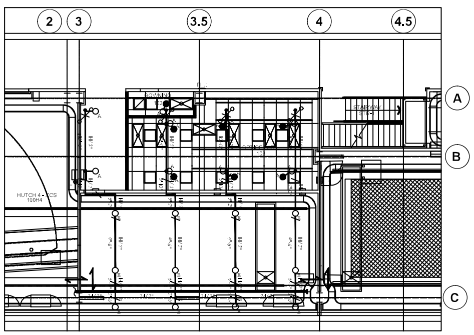
REV	DESCRIPTION	DRN	CHK	APP	DATE	REV	DESCRIPTION	DRN	CHK	APP	DATE
D	100% CD	JS	KM	JS	03-31-2026	A	30% CD	JS	KM	JS	12-02-2025
E	F&O AND BIO REVIEW	JS	KM	JS	05-01-2026	B	60% CD	JS	KM	JS	12-16-2025
F	F&O AND BIO REVIEW	JS	KM	JS	05-18-2026	C	90% CD	JS	KM	JS	01-06-2026



SECTION VIEW A - C



NEW FLOOR PLAN



NEW REFLECTED CEILING PLAN

1ST FLR PIPING / RCP PLAN 1/8"=1'-0"

tyco Worldwide Contacts www.tyco-fire.com

Series TY-B, 5.6 K-factor Upright, Pendent, and Recessed Pendent Sprinklers Standard Response, Standard Coverage

General Description

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers described in this data sheet are standard response, standard coverage, decorative 5 mm glass bulb type spray sprinklers designed for use in light, ordinary, or extra hazard, commercial occupancies such as banks, hotels, shopping malls, factories, refineries, and chemical plants.

The recessed version of the Series TY-B Pendent Sprinkler, where applicable, is intended for use in areas with a finished ceiling. This recessed pendent sprinkler uses one of the following:

- A two-piece Style 15 Recessed Escutcheon with recessed adjustment up to 5/8 in. (15,9 mm) from the flush pendent position.
- A two-piece Style 20 Recessed Escutcheon with recessed adjustment up to 1/2 in. (12,7 mm) from the flush pendent position.

The adjustment provided by the Recessed Escutcheon reduces the accuracy to which the fixed pipe drops to the sprinklers must be cut.

Intermediate level versions of Series TY-B Sprinklers are described in Technical Data Sheet TFP352. Sprinkler guards and shields are described in Technical Data Sheet TFP780.

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.

NOTICE

The Series TY-B Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Sprinkler Identification Numbers (SINs)

TY315 . . . . Upright 5.6K, 1/2 in. NPT
TY325 . . . . Pendent 5.6K, 1/2 in. NPT

Technical Data

Approvals
Refer to Table A

Maximum Working Pressure
175 psi (12,1 bar)
250 psi (17,2 bar)*

Discharge Coefficient
K = 5.6 GPM/psi½ (80,6 LPM/bar½)

Temperature Ratings
Refer to Table A

Finishes
Sprinkler: Refer to Table B
Recessed Escutcheon: White Coated, Black Coated, Chrome Plated, or Brass Plated

Physical Characteristics
Frame . . . Bronze
Button . . . Brass/Copper
Sealing Assembly . . . Stainless Steel w/TEFLON
Bulb . . . Glass
Compression Screw . . . Bronze
Deflector . . . Bronze

Operation

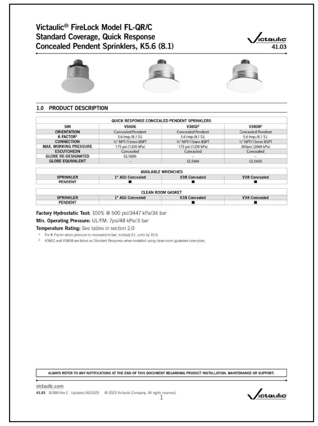
The glass bulb contains a fluid which expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and water to flow.

Design Criteria

The TYCO Series TY-B, 5.6 K-factor, Upright (TY315) and Pendent (TY325) Sprinklers are intended for fire protection systems designed in accordance with the standard installation rules recognized by the applicable Listing or Approval agency (e.g., UL Listing is based on the requirements of NFPA 13, and FM Approval is based on the requirements of the FM Loss Prevention Data Sheets). Only the Style 15 or Style 20 Recessed Escutcheon, as applicable, is to be used for recessed pendent installations.

Page 1 of 4 AUGUST 2018 TFP152

NEW/EX UPRIGHT SPRINKLER TYP.



Victaulic® FireLock Model FL-QR/C
Standard Coverage, Quick Response
Concealed Pendent Sprinklers, K5.6 (8.1)

Victaulic 41.03

1.0 PRODUCT DESCRIPTION

QUICK RESPONSE CONCEALED PENDENT SPRINKLERS			
SIN	V5606	V3802[2]	V3808[2]
ORIENTATION	Concealed Pendent	Concealed Pendent	Concealed Pendent
K-FACTOR[1]	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.	5.6 Imp./8.1 S.I.
CONNECTION	½" NPT/15mm BSPT	½" NPT/15mm BSPT	½" NPT/15mm BSPT
MAX. WORKING PRESSURE	175 psi (1200 kPa)	175 psi (1200 kPa)	300psi (2068 kPa)
ESCUTCHEON	Concealed	Concealed	Concealed
GLOBE RE-DESIGNATED	-	-	-
GLOBE EQUIVALENT	GL5606	GL5604	GL5605

AVAILABLE WRENCHES			
SPRINKLER PENDENT	1" ADJ Concealed	V38 Concealed	V38 Concealed

CLEAN ROOM GASKET			
SPRINKLER PENDENT	1" ADJ Concealed	V38 Concealed	V38 Concealed

Factory Hydrostatic Test: 100% @ 500 psi/3447 kPa/34 bar
Min. Operating Pressure: UL/FM: 7psi/48 kPa/.5 bar
Temperature Rating: See tables in section 2.0

[1] For K-Factor when pressure is measured in bar, multiply S.I. units by 10.0.
[2] V3802 and V3808 are listed as Standard Response when installed using clean room gasketed coverplate.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

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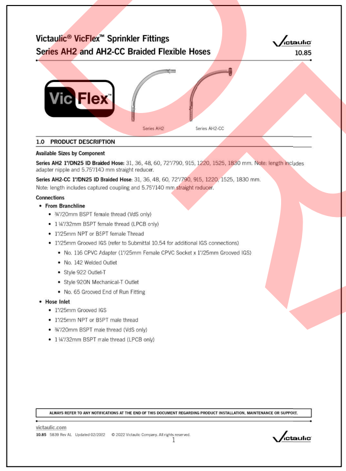
NEW PENDENT SPRINKLER TYP.



Victaulic® VicFlex™ Sprinkler Fittings
Series AH2 and AH2-CC Braided Flexible Hoses

Victaulic 10.85

Series AH2 Series AH2-CC

1.0 PRODUCT DESCRIPTION

Available Sizes by Component

Series AH2 1"/DN25 ID Braided Hose: 31, 36, 48, 60, 72/1790, 915, 1220, 1525, 1830 mm. Note: length includes adapter nipple and 5.75/143 mm straight reducer.

Series AH2-CC 1"/DN25 ID Braided Hose: 31, 36, 48, 60, 72/1790, 915, 1220, 1525, 1830 mm.
Note: length includes captured coupling and 5.75/140 mm straight reducer.

Connections
- From Branchline
  - ¾"/20mm BSPT female thread (VdS only)
  - 1 ¼"/32mm BSPT female thread (LPCB only)
  - 1"/25mm NPT or BSPT female Thread
  - 1"/25mm Grooved IGS (refer to Submittal 10.54 for additional IGS connections)
    - No. 116 CPVC Adapter (1"/25mm Female CPVC Socket x 1"/25mm Grooved IGS)
    - No. 142 Welded Outlet
    - Style 922 Outlet-T
    - Style 920N Mechanical-T Outlet
    - No. 65 Grooved End of Run Fitting
- Hose Inlet
  - 1"/25mm Grooved IGS
  - 1"/25mm NPT or BSPT male thread
  - ¾"/20mm BSPT male thread (VdS only)
  - 1 ¼"/32mm BSPT male thread (LPCB only)

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

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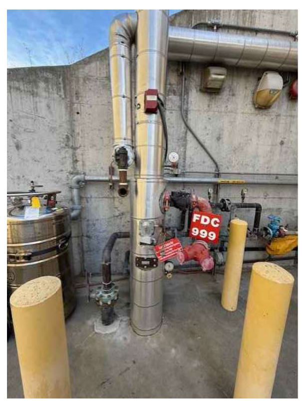
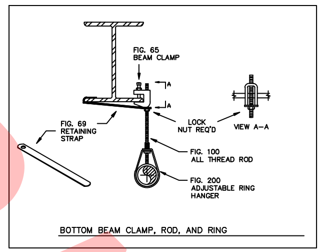
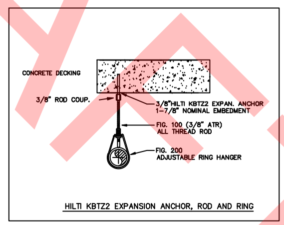
FLEXIBLE CONNECTION DETAIL



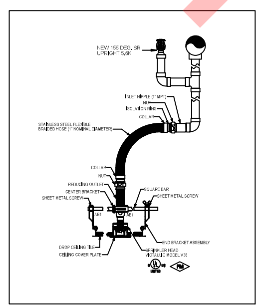
B999 FIRE SPRINKLER RISER



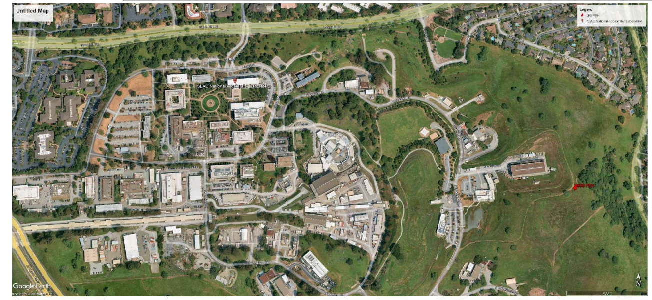
HANGER DETAIL OPTION 1



HANGER DETAIL OPTION 2

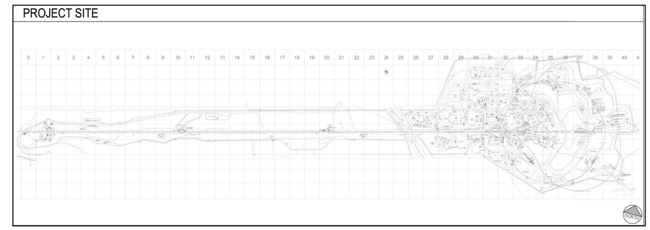


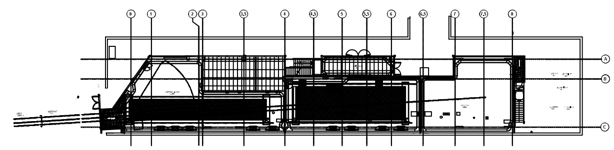
TYP. SPRINKLER CONFIGURATION



VICINITY MAP

PROJECT SITE





BUILDING 999 MAP

GENERAL NOTES

1. OCCUPANCY
   LIGHT HAZARD - OPEN OFFICE
   ORDINARY HAZARD - LAB SPACE
2. INSTALLATION SHALL CONFORM TO THE 2025 EDITION OF NFPA 13 AND LOCAL AUTHORITIES
3. HANGERS & SWAY-BRACING SHALL ALSO BE CONSIDERED A PART OF THE ABOVE STANDARD
4. ALL MATERIAL TO BE NEW AND FREE FROM DEFECTS
5. SPRINKLER HEADS ARE TO BE INSTALLED CENTER OF TILE
6. EXISTING SYSTEM IS HYDRAULICALLY DESIGNED .15/1579
7. MAXIMUM HEAD SPACING TO BE 130 SQ FT FOR PENDENT HEADS IN LAB AREA
8. MAXIMUM HEAD SPACING TO BE 225 SQ FT FOR PENDENT HEADS IN OFFICE AREA

All changes from the BIO approved job set of plans and specifications shall be submitted to and approved by the BIO office prior to the changes being made in the field.

SLAC BUILDING INSPECTION OFFICE
Construction Authorization (FC)
BY: cnadler
DATE: 5/31/2026 PRS#: 26-118
Revised Authorization ☑ No ☐ Yes
These plans have been reviewed for compliance with applicable building codes and standards, and ES&H program requirements.
The authorization of these plans shall not be construed to be a permit or an approval for violation of any applicable codes, standards, or ES&H programs.
THESE PLANS SHALL BE KEPT ON THE JOB SITE FOR ALL CONSTRUCTION INSPECTIONS.

— DENOTES	— 3/8 WEDGE ANCHOR W/ ROD AND RING
— DENOTES	— LATERAL / LONGITUDINAL BRACING
— DENOTES	— FIG. 90S & FIG. 1001 FAST CLAMP BRANCH LINE RESTRAINT
— DENOTES	— PIPE DROP DOWN
— DENOTES	— EXISTING PIPE
— DENOTES	— NEW PIPE
— DENOTES	— MECHANICAL TEE TYP.

SYMBOL	MANUF.	TYPE	TEMP.	QUAN.
● A	VICTAULIC	ADD MDL V5606 QR SSP 1/2" K-5.6	155°	7
○ A	TYCO	ADD MDL TY315 SR SSU 1/2" K-5.6	155°	9
○ E	TYCO	EX MDL TY315 SR SSU 1/2" K-5.6	155°	12
		TOTAL THIS SHEET		28

FIRE DISTRICT	SLAC FIRE MARSHAL	650-926-3300
BUILDING DEPT.	N/A	-
ARCHITECT	VEKTOR ENGINEERING	866 835 8671
GEN. CONTRACTOR	N/A	-

0' 2' 4' 6' 8' 10' 20'
GRAPHIC SCALE

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NEW CEILING HEIGHT WALLS
NEW PARTIAL HEIGHT WALLS
NEW ACT CEILING

SEAMLESS FIRE PROTECTION CONTRACTOR
J SIMKOWSKI
CLASSIFICATION C-16 HIC
LICENSE NO 1016978
LICENSED FIRE PROTECTION STATE OF CALIFORNIA

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DES	SIMKOWSKI, JUSTIN	05-18-2026
CHKR	MCGRAW, KEN	05-18-2026

APPROVALS DATE

B999
OPTICS LAB DESIGN
FIRE PROTECTION
GENERAL FIRE PROTECTION

DRAWING NUMBER
B0999-FX1-0151

REVISION
F E

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