

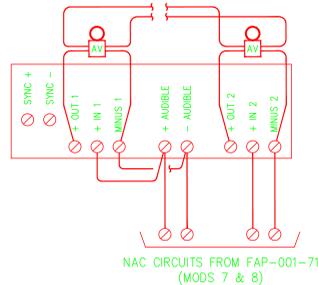
SEQUENCE OF OPERATIONS

SYSTEM EVENT	ANNUNCIATE EVENT BY FACP	OPERATE PREACTION FIRE SPRINKLERS	OPERATE NOTIFICATION APPLIANCES	SHUT DOWN AHU-034 & AHU-035	SHUT DOWN AHU-01	FIRE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	PROBABLE SIGNAL TO LBNL RECEIVER
CIRCUIT 3-203-12 SMOKE DETECTOR ALARM	●	●	●	●	●	●	●	●
CIRCUITS 3-203-24 & 3-203-26 SMOKE DETECTOR ALARM	●	●	●	●	●	●	●	●
LOW AIR PRESSURE ALARM	●	●	●	●	●	●	●	●
CIRCUITS 3-203-12 OR 3-203-27 & LOW AIR PRESSURE ALARM	●	●	●	●	●	●	●	●
VALVE POSITION SUPERVISORY SWITCH ALARM	●	●	●	●	●	●	●	●
PRESSURE OPERATED WATERFLOW SWITCH ALARM	●	●	●	●	●	●	●	●
CIRCUIT 3-203-27 HSSD DETECTOR ALARM (FIRE)	●	●	●	●	●	●	●	●
CIRCUIT 3-203-59 HSSD POWER SUPERVISION	●	●	●	●	●	●	●	●
CIRCUIT 3-203-60 HSSD DETECTOR SUPERVISION	●	●	●	●	●	●	●	●
SYSTEM FAULT	●	●	●	●	●	●	●	●

NOTE:
THE SEQUENCE OF OPERATIONS ABOVE ADDRESSES ACTIONS AS A RESULT OF THIS PROJECT ONLY (E.G. ALL BUILDING FIRE ALARM FUNCTIONS ARE NOT SHOWN).

1 FIRE ALARM LOGIC DIAGRAM

FA-001 SCALE:

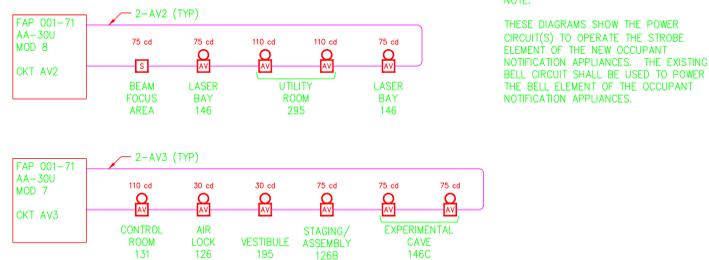


NOTES:

1. SYNC. VISUAL APPLIANCES, ONLY. NEW AND EXISTING BELLS WILL UTILIZE THE EXISTING BELL CIRCUIT(S).
2. SYNC. MODULE(S) TO BE MOUNTED ON THE WALL ADJACENT TO THE EXISTING FACP.

2 TYPICAL APPLIANCE SYNCH MODULE DETAIL

FA-001 SCALE:

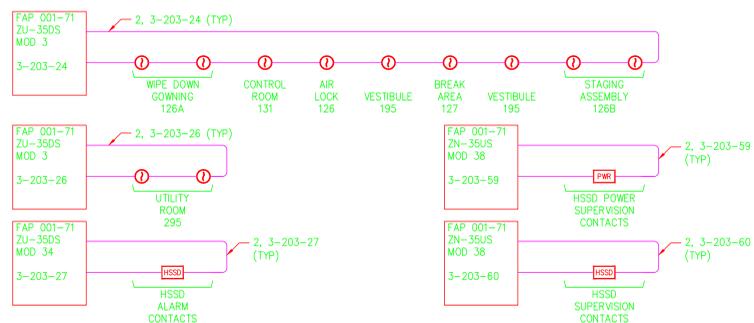


NOTE:

THESE DIAGRAMS SHOW THE POWER CIRCUIT(S) TO OPERATE THE STROBE ELEMENT OF THE NEW OCCUPANT NOTIFICATION APPLIANCES. THE EXISTING BELL CIRCUIT SHALL BE USED TO POWER THE BELL ELEMENT OF THE OCCUPANT NOTIFICATION APPLIANCES.

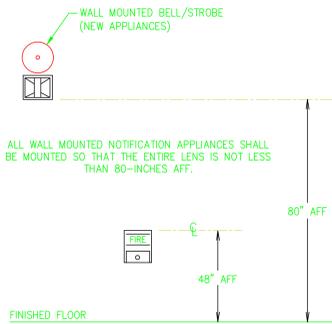
3 NOTIFICATION APPLIANCE RISER DIAGRAM

FA-001 SCALE:



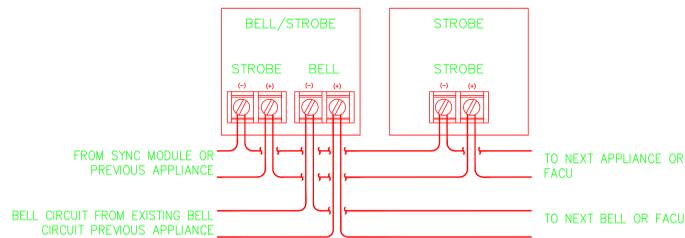
4 ALARM INITIATING AND CONTROL CIRCUIT RISER DIAGRAMS

FA-001 SCALE:



5 DEVICE / APPLIANCE MOUNTING DETAIL

FA-001 SCALE:



6 NOTIFICATION APPLIANCE DETAIL

FA-001 SCALE:

NOTIFICATION APPLIANCE CIRCUIT POWER REQUIREMENTS

DESCRIPTION	CURRENT PER APPLIANCE	# OF APPLIANCES	
		CIRCUIT AV2	CIRCUIT AV3
COOPER WHEELOK EXCEEDER SERIES WALL STROBE 15 cd	0.057	0	0
COOPER WHEELOK EXCEEDER SERIES CEILING STROBE 15 cd	0.061	0	0
COOPER WHEELOK EXCEEDER SERIES WALL STROBE 30 cd	0.085	0	2
COOPER WHEELOK EXCEEDER SERIES CEILING STROBE 30 cd	0.085	0	0
COOPER WHEELOK EXCEEDER SERIES WALL STROBE 75 cd	0.135	3	3
COOPER WHEELOK EXCEEDER SERIES CEILING STROBE 75 cd	0.135	0	0
COOPER WHEELOK EXCEEDER SERIES WALL STROBE 110 cd	0.162	2	1
COOPER WHEELOK EXCEEDER SERIES CEILING STROBE 95 cd	0.163	0	0
TOTAL CIRCUIT CURRENT	0.769	0.757	

THE FOLLOWING NOTIFICATION APPLIANCES AND THEIR POWER DEMANDS WERE USED IN THE DESIGN:
 1. COOPER NOTIFICATION, WHEELOK EXCEEDER SERIES STROBES; 15CD (0.057 AMP), 30CD (0.085 AMP), 75CD (0.135 AMP) & 110CD (0.162 AMP) WALL MOUNTED STROBE; RATED 16 TO 33 AMP.
 2. COOPER NOTIFICATION, WHEELOK EXCEEDER SERIES STROBES; 15CD (0.061 AMP), 30CD (0.085 AMP), 75CD (0.135 AMP) & 95CD (0.163 AMP) CEILING MOUNTED STROBE; RATED 16 TO 33 AMP.

VOLTAGE DROP CALCULATIONS

$I(D) (21.6) / CM$
 WHERE: I = CIRCUIT POWER LOAD 21.6 = CONSTANT
 D = CONDUCTOR ONE WAY DISTANCE CM = CROSS SECTION AREA OF WIRE (4110 FOR AWG#14)

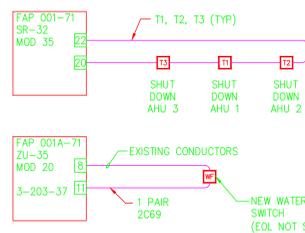
NAC AV1
 [0.769 AMP] (700 FT) (21.64) / 4110 VOLTAGE DROP: 2.834 VOLTS AVAILABLE VOLTAGE: 21.166 VOLTS

NAC AV3
 [0.757 AMP] (700 FT) (21.64) / 4110 VOLTAGE DROP: 2.790 VOLTS AVAILABLE VOLTAGE: 21.210 VOLTS

THE CIRCUIT'S AVAILABLE VOLTAGE IS ABOVE THE MINIMUM LISTED VOLTAGE FOR THE APPLIANCES.

7 POWER & VOLTAGE DROP CALCULATIONS

FA-001 SCALE:



GENERAL NOTES:

- 1) IN GENERAL, WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE DETAILED DESIGN, FABRICATION, PROCUREMENT, AND INSTALLATION OF THE COMPLETE FIRE PROTECTION SYSTEMS ADDITIONS AND MODIFICATIONS AS INDICATED ON THE CONTRACT DRAWINGS, INCLUDING:
 ALL PENETRATIONS THROUGH WALLS, FLOORS AND CEILINGS NECESSARY FOR THE INSTALLATION OF THE FIRE PROTECTION SYSTEMS INCLUDING THE INSTALLATION OF APPROVED FIRESTOP ASSEMBLIES NECESSARY TO MAINTAIN THE DESIGNED FIRE RESISTANCE RATING OF THE WALL, CEILING, OR FLOOR ASSEMBLY.
 CONNECTIONS TO THE EXISTING FIRE ALARM SYSTEM AS INDICATED.
 SYSTEMS AND DEVICE TESTING.
 ALL NECESSARY PERMITS.
 THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND IMPLEMENTING ALL SAFETY PROGRAMS AND PROCEDURES FOR THIS PROJECT AND SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL SAFETY AND HEALTH REGULATIONS.
- 2) THE CONTRACT DRAWINGS ARE DIAGRAMMATIC ONLY. THE SUBCONTRACTOR SHALL DETERMINE THE ACTUAL MEASUREMENTS AND MAKE ANY AND ALL SUCH LENGTH AND OFFSET ADJUSTMENTS AS MAY BE NECESSARY TO COMPLETE THE INSTALLATION AT NO CHANGE IN THE CONTRACT PRICE. THE DRAWINGS ARE NOT INTENDED TO RELIEVE THE SUBCONTRACTOR OF ANY RESPONSIBILITY FOR AVOIDING CONFLICTS OR OBSTRUCTIONS, OR FOR INSTALLING THE NUMBER OF SPRINKLERS AND SUPPLY PIPING AS REQUIRED TO PROVIDE COMPLETE PROTECTION OF THE DESIGNATED AREAS IN ACCORDANCE WITH THE REQUIREMENTS OF THE REFERENCED STANDARDS AND THESE SPECIFICATIONS. WRITTEN APPROVAL SHALL BE OBTAINED FROM THE UNIVERSITY'S REPRESENTATIVE PRIOR TO MAKING ANY MAJOR DEVIATIONS FROM THE ARRANGEMENT AND LAYOUT SHOWN ON THE DRAWINGS.
- 3) ALL EQUIPMENT SHALL BE NEW, AND APPROVED AND/OR LISTED BY UNDERWRITERS' LABORATORIES OR FACTORY MUTUAL.
- 4) SYSTEM, EQUIPMENT, INSTALLATION, AND MATERIALS AND METHODS USED SHALL COMPLY WITH THE FOLLOWING:
 THE REQUIREMENTS OF THE LAWRENCE BERKELEY NATIONAL LABORATORY.
 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 72 NATIONAL FIRE ALARM CODE 2007 EDITION.
 CALIFORNIA BUILDING AND FIRE CODES.
 MANUFACTURER'S RECOMMENDATIONS AND GUIDELINES.
- 5) ALL NEW CONDUIT SHALL BE MINIMUM 1/2 INCH DIAMETER.

LEGEND:

- NEW CEILING MOUNTED SIEMENS PE-3 SMOKE DETECTOR
- NEW HVAC FAN UNIT INTERPOSING SHUT DOWN RELAY
- NEW WALL MOUNTED BELL/STROBE, CANDELA AS NOTED
- NEW WALL MOUNTED STROBE, CANDELA AS NOTED
- NEW 1/2 INCH CONDUIT, CONTAINING IDENTIFIED CIRCUITS
- HSSD SAMPLE PIPING
- HSSD DETECTOR
- HSSD SAMPLE PORT DRILLED IN PIPE (CAVE 146C)
- HSSD SAMPLE PORT ON CAPILLARY TUBE DROP FROM ABOVE SUSPENDED CEILING (LASER BAY 146)
- HSSD SAMPLE PORT (PLAN VIEW)
- EXISTING PRESSURE OPERATED WATERFLOW SWITCH
- EXISTING LOW AIR PRESSURE SWITCH
- EXISTING VALVE POSITION SUPERVISORY SWITCH
- EXISTING PREACTION FIRE SPRINKLER SOLENOID
- EXISTING BELL/STROBE, CANDELA AS NOTED
- EXISTING CONDUIT, CONTAINING IDENTIFIED CIRCUITS

REV.	DATE	DESCRIPTION	BY	CHECKED
1	10/21/10	RESPONSE TO LBNL FM COMMENTS	HYT	HYT
KEY PLAN			DRAWN	CHECKED

CLIENT: BERKELEY LAB

PROJECT: BUILDING 71 BERKELEY LAB LASER ACCELERATOR (BELLA) CONVENTIONAL FACILITIES

M+W GROUP

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 Fire Protection Engineers and Consultants
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 Concord, California 94521
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SHEET TITLE: FIRE ALARM GENERAL NOTES, LEGEND, AND TYPICAL INSTALLATION DETAILS

DATE	NAME	PROJ. NO.	PROJ. PHASE
04/21/2010	DWH	12092	FINAL
04/21/2010	BBT		
06/26/2010			

SCALE/SHT. SIZE: AS NOTED

CTB FILE: LBNL_B&W_Full

FA-001

FOR CONSTRUCTION