NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2 – 46 SOUTH, 1ST & 2ND FLRS, B46D DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.0210	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	1	0.2200	0.2200
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	3	0.0870	0.2610
AUTOCALL BELL	6	0.0500	0.3000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.7810

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM
WHERE: I = CIRCUIT CURRENT
D = CONDUCTOR LENGTH (FT) ONE WAY
21.6 = CONSTANT
CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(0.781A) (460FT) (21.64)}/4110 = 1.888V
%VD = {1.888V / 24V} X 100 = 7.867%
REMAINING VOLTS = 22.112

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

BATTERY CALCULATIONS FAP–001–46

ITEM	DESCRIPTION	QTY	STANDBY CURRENT PER ITEM (AMPS)	TOTAL STANDBY CURRENT PER ITEM	ALARM CURRENT PER ITEM (AMPS)	TOTAL ALARM CURRENT PER ITEM
CP–35	FACP w/2ZN'S + AUD	1	0.1750	0.1750	0.5010	0.5010
PS–35	POWER SUPPLY	2	0.0000	0.0000	0.0000	0.0000
BC–35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
AA–30U	CLASS B BELL MODULE	–	0.0065	0.0000	0.0400	0.0000
SM–30	SWITCH MODULE	2	0.0000	0.0000	0.0450	0.0900
SR–30	2 RELAY MODULE	3	0.0000	0.0000	0.0450	0.1350
SR–32	6 RELAY MODULE	2	0.0000	0.0000	0.0450	0.0900
SR–35	8 RELAY MODULE	1	0.0000	0.0000	0.0210	0.0210
TC–30U	BATTERY TRANSFER	1	0.0300	0.0300	0.0150	0.0150
ZN–34US	SUPERVISORY MODULE	2	0.0100	0.0200	0.1100	0.2200
ZU–35	ZONE MODULE	3	0.0090	0.0270	0.1100	0.3300
ZU–35DS	ZONE MODULE/SD's	2	0.0090	0.0180	0.1100	0.2200
SMOKE	SMOKE DETECTOR	2	0.0001	0.0002	0.0010	0.0020
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	1	0.0020	0.0020	0.0000	0.0000
PS–5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						1.8790
	TOTAL SYSTEM CURRENT		STANDBY	0.4752	ALARM	3.7080

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.4752A X 24 HR) + (3.7080 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {11.4048 AHr + 0.3078 AHr} X 1.25 = 14.6407 AHr

FIRE ALARM SYSTEM FUNCTION CHART

SYSTEM EVENT / RESPONSE	ANNUNCIATE AT FACU	FIRE SIGNAL TO RECEIVER	TROUBLE SIGNAL TO LBNL RECEIVER	SUPERVISORY SIGNAL TO LBNL RECEIVER	OPERATE NOTIFICATION APPLIANCES	OPERATE BLDG 46 DOOR HOLDERS
46, 46A, B46B & B46D FIRE CALL BOX	●	●			●	●
46 SMOKE DETECTOR	●	●			●	●
B46B, B46D HEAT DETECTOR	●	●			●	
46, 46A FIRE SPRINKLER WATERFLOW SWITCH	●	●			●	●
46 FIRE SPRINKLER SUPERVISORY SWITCH	●			●		
AC POWER FAILURE	●		●			
SYSTEM FAULT	●		●			

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3 – 46A DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.0210	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	–	0.0000	0.0000
AUTOCALL BELL	1	0.0500	0.0500
TOTAL NOTIFICATION APPLIANCES CURRENT			0.0500

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM
WHERE: I = CIRCUIT CURRENT
D = CONDUCTOR LENGTH (FT) ONE WAY
21.6 = CONSTANT
CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(0.05A) (180FT) (21.64)}/4110 = 0.047V
%VD = {0.047V / 24V} X 100 = 0.197%
REMAINING VOLTS = 23.953

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1 – 46 NORTH, 1ST & 2ND FLRS, B46B DESCRIPTION	QTY	CURRENT PER ITEM (AMPS)	TOTAL CURRENT PER ITEM
WHEELOCK STROBE 15 cd	–	0.5010	0.0000
WHEELOCK HORN/STROBE 15cd	–	0.0000	0.0000
WHEELOCK STROBE 30 cd	–	0.0300	0.0000
WHEELOCK HORN/STROBE 30 cd	–	0.0450	0.0000
WHEELOCK STROBE 75 cd	–	0.0210	0.0000
WHEELOCK HORN/STROBE 75 cd	–	0.1100	0.0000
WHEELOCK STROBE 110 cd	–	0.1100	0.0000
WHEELOCK HORN/STROBE 110 cd	–	0.1750	0.0000
WHEELOCK HORN	4	0.0870	0.2480
AUTOCALL BELL	14	0.0500	0.7000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.0480

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM
WHERE: I = CIRCUIT CURRENT
D = CONDUCTOR LENGTH (FT) ONE WAY
21.6 = CONSTANT
CM = WIRE CROSS-SECTIONAL AREA (CIRCULAR MILS)

VD = {(1.048A) (300FT) (21.64)}/4110 = 1.652V
%VD = {1.652V / 24V} X 100 = 6.885%
REMAINING VOLTS = 22.348

WIRE SIZE	CIRCULAR MILS
12AWG	6530
14AWG	4110
16AWG	2580
18AWG	1620
20AWG	1020

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	46 NORTH, 1ST & 2ND FLRS, B46B	1.048
CKT AV2	46 SOUTH, 1ST & 2ND FLRS, B46D	0.781
CKT AV3	46A	0.050
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	1.879

AS BUILT
–
–
09/17/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
–	LDD	LDD	MCD	09/17/13	AS BUILT

PROFESSIONAL SEAL (IF REVISION, APPLIES ONLY TO REVISED WORK)

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD)

BLDG 46,46A,TRLRS FIRE ALARM FUNCTION CHART & CALCULATIONS
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UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 09/17/2013
CHECKED BY	LDD	09/17/2013
APPROVED BY	MCD	09/17/2013
SCALE	AS NOTED	
DRAWING NO.	4B46E011_	SHEET 1 OF 1
PROJECT NO.	000000	