NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: RM 3347A VESDA 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	6	0.1650	0.9900
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	1	0.0870	0.0870
AUTOCALL BELL	–	0.0500	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT			1.077

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 = {(1.077A) (170FT) (21.64)}/6530 = 0.962V
%VD = {0.962V / 24V} X 100 = 4.009%
REMAINING VOLTS = 23.038

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

BATTERY CALCULATIONS FAP-001,-001A,-001B-70A

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	2	0.1750	0.3500	0.5010	1.0020
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	1	0.0065	0.0065	0.0400	0.0400
AE-30U	CLASS B BELL MODULE	4	0.0065	0.0260	0.0400	0.1600
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
SM-30	SWITCH MODULE	11	0.0000	0.0000	0.0450	0.4950
SR-32	6 RELAY MODULE	1	0.0000	0.0000	0.0450	0.0450
SR-35	8 RELAY MODULE	2	0.0000	0.0000	0.0210	0.0420
TC-30U	BATTERY TRANSFER	1	0.0300	0.0300	0.0150	0.0150
ZN-34US	SUPERVISORY MODULE	10	0.0100	0.1000	0.1100	1.1000
ZU-35	ZONE MODULE	9	0.0090	0.0810	0.1100	0.9900
ZU-35DS	ZONE MODULE/SD's	8	0.0090	0.0720	0.1100	0.8800
SMOKE	SMOKE DETECTOR	136	0.0001	0.0136	0.0010	0.1360
MOI	TRANSMITTER	1	0.1200	0.1200	0.1750	0.1750
MID	INPUT BOARD	2	0.0020	0.0040	0.0000	0.0000
PS-5A	POWER SUPPLY	1	0.0380	0.0380	0.0000	0.0000
TOTAL NOTIFICATION APPLIANCES CURRENT						2.1870
TOTAL SYSTEM CURRENT			STANDBY	0.8881	ALARM	7.2970

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25
MIN. BATTERY CAPACITY = {(0.8881 A X 24 HR) + (7.297 A X 0.083 HR)} X 1.25
MIN. BATTERY CAPACITY = {21.3144 AHr + 0.6057 AHr} X 1.25 = 27.4001 AHr

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: 70 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	4	0.1650	0.6600
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	9	0.0500	0.4500
TOTAL NOTIFICATION APPLIANCES CURRENT			1.1100

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 = {(1.11A) (210FT) (21.64)}/6530 = 1.225V
%VD = {1.225V / 24V} X 100 = 5.104%
REMAINING VOLTS = 22.775

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

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	ELEVATOR RECALL	AHU-27, -28, -29 SHUTDOWN	DAMPER CLOSE	DOOR HOLDER RELEASE
FIRE CALL BOX	●	●			●	●	●	●	●
HEAT DETECTOR	●	●			●	●	●	●	●
SMOKE DETECTOR	●	●			●	●	●	●	●
ELEVATOR LOBBY SMOKE DETECTOR	●	●			●	●	●	●	●
DUCT SMOKE DETECTOR (AHU-27, -28, -29)	●	●			●	●	●	●	●
FIRE SPRINKLER WATERFLOW SWITCH	●	●			●	●	●	●	●
FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●					
RM 3347A VESDA PANEL	●		●						
AC POWER FAILURE	●		●						
SYSTEM FAULT	●		●						

NOTE: ALSO SEE FUNCTION CHART ON 4B70AE056

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	70	1.110
CKT AV2	RM 3347A VESDA	1.077
CKT AV3	–	–
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	2.187

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

AS BUILT
–
–
10/02/13

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

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	10/02/13	AS BUILT

BLDG 70A FIRE ALARM
FUNCTION CHART & CALCULATIONS
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UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 10/02/13
CHECKED BY	LDD	10/02/13
APPROVED BY	MCD	10/02/13
SCALE	AS NOTED	
DRAWING NO.	4B70AE194_	SHEET
PROJECT NO.	000000	1 OF 1