NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2: BLDG 5 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	3	0.0000	0.1500
TOTAL NOTIFICATION APPLIANCES CURRENT			0.1500

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.15A) (240FT) (21.64)}/4110 = 0.189V

%VD = {0.189V / 24V} X 100 = 0.788%

REMAINING VOLTS = 23.811

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

BATTERY CALCULATIONS FAP-001-07

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	2	0.0065	0.0130	0.0400	0.0800
AE-30U	CLASS B BELL MODULE	2	0.0065	0.0130	0.0400	0.0800
PM-32	MATRIX MODULE	1	0.0000	0.0000	0.0000	0.0000
SM-30	SWITCH MODULE	2	0.0000	0.0000	0.0450	0.0450
SR-30	2 RELAY MODULE	1	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 TROUBLE	1	0.0300	0.0300	0.0500	0.0500
ZN-34US	SUPERVISORY MODULE	2	0.0100	0.0200	0.1100	0.1100
ZU-35	ZONE MODULE	4	0.0090	0.0360	0.1100	0.4400
ZU-35DS	ZONE MODULE/SD's	3	0.0090	0.0270	0.1100	0.3300
SMOKE	SMOKE DETECTOR	17	0.0001	0.0017	0.0010	0.0170
HEAT	HEAT DETECTOR	2	0.0000	0.0000	0.0000	0.0000
PULL	PULL STATION	9	0.0000	0.0000	0.0000	0.0000
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						0.4500
	TOTAL SYSTEM CURRENT		STANDBY	0.5227	ALARM	2.4940

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.2

MIN. BATTERY CAPACITY = {(0.5227 A X 24 HR) + (2.494 A X 0.083 HR)} X 1.2

MIN. BATTERY CAPACITY = {12.5448 AHr + 0.207 AHr} X 1.2 = 15.9398 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 B4 NOTIFICATION APPLIANCES	OPERATE B5 NOTIFICATION APPLIANCES	OPERATE B14 NOTIFICATION APPLIANCES	RELEASE B4 DOOR HOLDERS	RELEASE B5 DOOR HOLDERS
B4 FIRE CALL BOX	●	●			●			●	
B4 SMOKE DETECTOR	●	●			●			●	
B4 FIRE SPRINKLER WATERFLOW SWITCH	●	●			●			●	
B4 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●					
B5 FIRE CALL BOX	●	●				●			●
B5 SMOKE DETECTOR	●	●				●			●
B5 FIRE SPRINKLER WATERFLOW SWITCH	●	●				●			●
B5 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●					
B14 FIRE CALL BOX	●	●					●		
B14 FIRE SPRINKLER WATERFLOW SWITCH	●	●					●		
B14 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●					
AC POWER FAILURE	●		●						
SYSTEM FAULT	●		●						

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3: BLDG 14 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	2	0.0000	0.1000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.1000

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.1A) (250FT) (21.64)}/4110 = 0.131V

%VD = {0.131V / 24V} X 100 = 0.547%

REMAINING VOLTS = 23.869

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1: BLDG 4 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	4	0.0500	0.2000
TOTAL NOTIFICATION APPLIANCES CURRENT			0.2000

VOLTAGE DROP (VD) CALCULATIONS

VD = {(I) (D) (21.6)}/CM

WHERE: I = CIRCUIT CURRENT

D = CONDUCTOR LENGTH (FT) ONE WAY

21.6 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.2A) (185FT) (21.64)}/4110 = 0.194V

%VD = {0.194V / 24V} X 100 = 0.81%

REMAINING VOLTS = 23.806

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	BLDG 4	0.200
CKT AV2	BLDG 5	0.150
CKT AV3	BLDG 14	0.100
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	0.450

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

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

AS BUILT
–
–
10/29/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
–	LDD	LDD	MCD	10/29/13	AS BUILT

BLDG 4 FIRE ALARM
5 & 14
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 10/29/2013
CHECKED BY	LDD	10/29/2013
APPROVED BY	MCD	10/29/2013
SCALE	AS NOTED	
DRAWING NO.	4B04E030_	SHEET FA
PROJECT NO.	000000	1 OF 1