NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV2 – BLDG 27 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 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.05A) (120FT) (21.64)}/4110 = 0.032V

%VD = {0.032V / 24V} X 100 = 0.131%

REMAINING VOLTS = 23.968

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

BATTERY CALCULATIONS FAP–001 & –001A–53

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	1	0.0000	0.0000	0.0000	0.0000
BC–35	BATTERY CHARGER	1	0.0450	0.0450	0.0300	0.0300
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	0.0900
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–34UA	SUPERVISORY MODULE	3	0.0100	0.0300	0.1100	0.3300
ZU–35	ZONE MODULE	3	0.0090	0.0270	0.1100	0.3300
ZU–35DS	ZONE MODULE/SD's	1	0.0090	0.0090	0.1100	0.1100
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						0.2500
	TOTAL SYSTEM CURRENT		STANDBY	0.4590	ALARM	1.9170

MIN. BATTERY CAPACITY = {(TOT. STANDBY CURRENT X STANDBY TIME) + (TOT. ALARM CURRENT X ALARM TIME)} X 1.25

MIN. BATTERY CAPACITY = {(0.4590 A X 24 HR) + (1.917A X 0.083 HR)} X 1.25

MIN. BATTERY CAPACITY = {11.0160 AHr + 0.1591 AHr} X 1.25 = 13.9689 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 53,B53B NOTIFICATION APPLIANCES	OPERATE 27 NOTIFICATION DEVICES	OPERATE 17 NOTIFICATION DEVICES
53, B53B FIRE CALL BOXES	●	●			●		
53, B53B HEAT DETECTORS	●	●			●		
53, B53B SMOKE DETECTORS	●	●			●		
53, B53B FIRE SPRINKLER WATERFLOW SWITCHES	●	●			●		
53–022 H2 DETECTOR	●		●				
53, B53B FIRE SPRINKLER VALVE SUPERVISORY SWITCHES	●			●			
27 FIRE CALL BOXES	●	●				●	
27 FIRE SPRINKLER WATERFLOW SWITCH	●	●				●	
27 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●			
17 FIRE CALL BOXES	●	●					●
17 FIRE SPRINKLER WATERFLOW SWITCH	●	●					●
17 FIRE SPRINKLER VALVE SUPERVISORY SWITCH	●			●			
AC POWER FAILURE	●		●				
SYSTEM FAULT	●		●				

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV3 – BLDG 53 & B53B 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	0.0500	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) (100FT) (21.64)}/4110 = 0.079V

%VD = {0.079V / 24V} X 100 = 0.328%

REMAINING VOLTS = 23.921

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

NOTIFICATION APPLIANCE CIRCUIT VOLTAGE DROP & POWER REQUIREMENTS

CKT AV1 – BLDG 17 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 = A CONSTANT

CM = CIRCULAR MILS

VD = {(0.05A) (200FT) (21.64)}/4110 = 0.053V

%VD = {0.053V / 24V} X 100 = 0.219%

REMAINING VOLTS = 23.947

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

NOTIFICATION APPLIANCE CIRCUIT CURRENTS

CKT AV1	BLDG 17	0.050
CKT AV2	BLDG 27	0.050
CKT AV3	BLDG 53 & B53B	0.150
CKT AV4	–	–
CKT AV5	–	–
CKT AV6	–	–
CKT AV7	–	–
CKT AV8	–	–
	TOTAL NOTIFICATION APPLIANCES CURRENT	0.250

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

ISSUE (PROGRESS, ESTIMATE, BID, CONSTRUCTION, CONFORMED, REVISION, RECORD): AS BUILT – – 09/23/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
_	LDD	LDD	MCD	09/23/13	AS BUILT

BLDG 53 FIRE ALARM
B53B,27,17
FUNCTION CHART & CALCULATIONS

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

DRAWN BY	LDD	DATE 9/23/2013
CHECKED BY	LDD	9/23/2013
APPROVED BY	MCD	9/23/2013
SCALE	AS NOTED	
DRAWING NO.	4B53E015_	SHEET 1 OF 1
PROJECT NO.	000000	