NOTIFICATION APPLIANCE CIRCUITS VOLTAGE DROP CALCULATIONS

VOLTAGE DROP CALCULATIONS: CIRCUIT V1

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V1-1	0.052	0.052	50	100	14	3.26	0.0170
V1-2	0.052	0.104	50	100	14	3.26	0.0339
V1-3	0.079	0.183	30	60	14	3.26	0.0358
V1-4	0.148	0.331	40	80	14	3.26	0.0863
V1-5	0.079	0.41	40	80	14	3.26	0.1069
V1-6	0.148	0.558	30	60	14	3.26	0.1091
V1-7	0.148	0.706	50	100	14	3.26	0.2302
V1-8	0.079	0.785	30	60	14	3.26	0.1535
V1-9	0.079	0.864	332	664	14	3.26	1.8702
	Total Load:	0.864				Total V-Drop	2.6430

21.3570 VOLTS REMAINING (within the voltage range of the appliances)
0.864 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V2

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V2-1	0.079	0.079	30	60	14	3.26	0.0155
V2-2	0.079	0.158	15	30	14	3.26	0.0155
V2-3	0.052	0.21	40	80	14	3.26	0.0548
V2-4	0.178	0.388	30	60	14	3.26	0.0759
V2-5	0.079	0.467	15	30	14	3.26	0.0457
V2-6	0.052	0.519	30	60	14	3.26	0.1015
V2-7	0.079	0.598	50	100	14	3.26	0.1949
V2-8	0.079	0.677	336	672	14	3.26	1.4831
	Total Load:	0.677				Total V-Drop	1.9868

22.0132 VOLTS REMAINING (within the voltage range of the appliances)
0.677 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V3

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V3-8	0.052	0.052	60	120	14	3.26	0.0203
V3-7	0.052	0.104	40	80	14	3.26	0.0271
V3-6	0.052	0.156	30	60	14	3.26	0.0305
V3-5	0.052	0.208	25	50	14	3.26	0.0339
V3-4	0.052	0.26	45	90	14	3.26	0.0763
V3-3	0.079	0.339	65	130	14	3.26	0.1437
V3-2	0.079	0.418	30	60	14	3.26	0.0818
V3-1	0.178	0.596	250	500	14	3.26	0.9715
	Total Load:	0.596				Total V-Drop	1.3851

22.6149 VOLTS REMAINING (within the voltage range of the appliances)
0.596 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V4

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V4-1	0.052	0.052	50	100	14	3.26	0.0170
V4-2	0.052	0.104	75	150	14	3.26	0.0509
V4-3	0.079	0.183	40	80	14	3.26	0.0477
V4-4	0.148	0.331	40	80	14	3.26	0.0863
V4-5	0.148	0.479	40	80	14	3.26	0.1249
V4-6	0.052	0.531	40	80	14	3.26	0.1385
V4-7	0.178	0.709	30	60	14	3.26	0.1387
V4-8	0.052	0.761	400	800	14	3.26	1.9847
	Total Load:	0.761				Total V-Drop	2.5886

21.4114 VOLTS REMAINING (within the voltage range of the appliances)
0.761 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V5

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V5-1	0.079	0.079	60	120	14	3.26	0.0309
V5-2	0.178	0.257	35	70	14	3.26	0.0586
V5-3	0.148	0.405	70	140	14	3.26	0.1848
V5-4	0.178	0.583	100	200	14	3.26	0.3801
V5-5	0.178	0.761	25	50	14	3.26	0.1240
V5-6	0.178	0.939	25	50	14	3.26	0.1531
V5-7	0.079	1.018	290	580	14	3.26	1.9248
	Total Load:	1.018				Total V-Drop	2.8564

21.1436 VOLTS REMAINING (within the voltage range of the appliances)
1.018 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V6

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V6-8	0.079	0.079	25	50	14	3.26	0.0129
V6-7	0.052	0.131	25	50	14	3.26	0.0214
V6-6	0.052	0.183	30	60	14	3.26	0.0358
V6-5	0.052	0.235	80	160	14	3.26	0.1226
V6-4	0.052	0.287	60	120	14	3.26	0.1123
V6-3	0.079	0.366	80	160	14	3.26	0.1909
V6-2	0.079	0.445	30	60	14	3.26	0.0870
V6-1	0.178	0.623	290	580	14	3.26	1.1780
	Total Load:	0.623				Total V-Drop	1.7608

22.2392 VOLTS REMAINING (within the voltage range of the appliances)
0.623 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V7

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V7-1	0.052	0.052	50	100	14	3.26	0.0170
V7-2	0.052	0.104	60	120	14	3.26	0.0407
V7-3	0.148	0.252	60	120	14	3.26	0.0986
V7-4	0.178	0.43	75	150	14	3.26	0.2103
V7-5	0.148	0.578	50	100	14	3.26	0.1884
V7-6	0.178	0.756	15	30	14	3.26	0.0739
V7-7	0.052	0.808	390	780	14	3.26	2.0546
	Total Load:	0.808				Total V-Drop	2.6834

21.3166 VOLTS REMAINING (within the voltage range of the appliances)
0.808 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V8

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V8-1	0.079	0.079	65	130	14	3.26	0.0335
V8-2	0.079	0.158	40	80	14	3.26	0.0412
V8-3	0.079	0.237	65	130	14	3.26	0.1004
V8-4	0.079	0.316	70	140	14	3.26	0.1442
V8-5	0.052	0.368	30	60	14	3.26	0.0720
V8-6	0.052	0.42	340	680	14	3.26	0.9311
	Total Load:	0.42	10	20		Total V-Drop	1.3224

22.6776 VOLTS REMAINING (within the voltage range of the appliances)
0.42 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V9

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V9-1	0.052	0.052	50	100	14	3.26	0.0170
V9-2	0.052	0.104	60	120	14	3.26	0.0407
V9-3	0.079	0.183	20	40	14	3.26	0.0239
V9-4	0.079	0.262	40	80	14	3.26	0.0683
V9-5	0.079	0.341	25	50	14	3.26	0.0556
V9-6	0.178	0.519	35	70	14	3.26	0.1184
V9-7	0.079	0.598	45	90	14	3.26	0.1755
V9-8	0.079	0.677	300	600	14	3.26	1.3242
	Total Load:	0.677	10	20		Total V-Drop	1.8235

22.1765 VOLTS REMAINING (within the voltage range of the appliances)
0.677 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V10

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V10-1	0.079	0.079	20	40	14	3.26	0.0103
V10-2	0.052	0.131	25	50	14	3.26	0.0214
V10-3	0.079	0.21	25	50	14	3.26	0.0342
V10-4	0.178	0.388	40	80	14	3.26	0.1012
V10-5	0.079	0.467	20	40	14	3.26	0.0609
V10-6	0.052	0.519	35	70	14	3.26	0.1184
V10-7	0.178	0.697	35	70	14	3.26	0.1591
V10-8	0.079	0.776	345	690	14	3.26	1.7455
	Total Load:	0.776	10	20		Total V-Drop	2.2510

21.7490 VOLTS REMAINING (within the voltage range of the appliances)
0.776 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V11

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V11-1	0.079	0.079	45	90	14	3.26	0.0232
V11-2	0.079	0.158	65	130	14	3.26	0.0670
V11-3	0.079	0.237	70	140	14	3.26	0.1082
V11-4	0.079	0.316	50	100	14	3.26	0.1030
V11-5	0.052	0.368	35	70	14	3.26	0.0840
V11-6	0.052	0.42	15	30	14	3.26	0.0411
V11-7	0.079	0.499	40	80	14	3.26	0.1301
V11-8	0.178	0.677	365	730	14	3.26	1.6111
	Total Load:	0.677	10	20		Total V-Drop	2.1676

21.8324 VOLTS REMAINING (within the voltage range of the appliances)
0.677 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

VOLTAGE DROP CALCULATIONS: CIRCUIT V12

Voltage Drop = (L/1000)(A)(R)
Where:
L = Conductor Distance (twice actual distance)
A = Load (amps)
R = Resistance per 1,000 ft (NEC Table 8)

Appliance Type	Appliance Load (amps)	Cummulative Load (amp)	Actual Distance (ft)	Conductor Distance (ft)	Conductor Gauge	Resistance per 1,000 ft	Voltage Drop
V12-1	0.052	0.052	50	100	14	3.26	0.0170
V12-2	0.052	0.104	45	90	14	3.26	0.0305
V12-3	0.079	0.183	15	30	14	3.26	0.0179
V12-4	0.052	0.235	25	50	14	3.26	0.0383
V12-5	0.148	0.383	35	70	14	3.26	0.0874
V12-6	0.079	0.462	35	70	14	3.26	0.1054
V12-7	0.079	0.541	40	80	14	3.26	0.1411
V12-8	0.148	0.689	350	700	14	3.26	1.5723
	Total Load:	0.689	10	20		Total V-Drop	2.0099

21.9901 VOLTS REMAINING (within the voltage range of the appliances)
0.689 TOTAL AMPS REQUIRED (within the listed power supply output)

NOTIFICATION APPLIANCES:

TYPE	MAKE	MODEL	CANDELA	LOAD	V-RANGE	NOTE
STROBE	WHEELOCK	NS4	15	0.052	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	30	0.079	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	75	0.148	16-33	MULTI CANDELA
STROBE	WHEELOCK	NS4	110	0.178	16-33	MULTI CANDELA

AS BUILT

06/14/13

REVISION NUMBER	DRAWN BY	CHECKED BY	APPR'D BY	DATE	REMARKS
–	DSV	LDD	MCD	6/14/13	AS BUILT PER FIELD VERIFICATION

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

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

BLDG-67 FIRE ALARM
VOLTAGE DROP CALCULATION

UNIVERSITY OF CALIFORNIA
LAWRENCE BERKELEY NATIONAL LABORATORY
FACILITIES DIVISION

		DATE
DRAWN BY	DSV	05/20/2013
CHECKED BY	LDD	7/8/2013
APPROVED BY	MCD	7/8/2013

SCALE

DRAWING NO. 4B67E149

SHEET 2

2 OF 21

PROJECT NO. FN1438