EST-3 Battery Calculations

FACP Data Loop 1, Signal Circuit S1

Description	Quantity		Standby (Amps)		Total Standby (Amps)	Alarm (Amps)	Total Alarm (Amps)
3-CPU	1	x	0.145000		0.145000	0.155000	0.155000
3-LCD	1	x	0.053000		0.053000	0.053000	0.053000
3-BPS	0	x	0.053000		0.000000	0.053000	0.000000
3-RS232	1	x	0.048000		0.048000	0.048000	0.048000
3-RS485	1	x	0.055000		0.055000	0.055000	0.055000
3-SDDC	1	x	0.256000		0.256000	0.294000	0.294000
3-MODCOM	1	x	0.060000		0.060000	0.090000	0.090000
3-IDC8/4	1	x	0.053000		0.053000	0.350000	0.350000
3-6/3S1G2Y	1	x	0.002000		0.002000	0.010000	0.010000
3-LCDANN	1	x	0.171000		0.171000	0.195000	0.195000
SIGA-CC1	2	x	0.000223		0.000446	0.000100	0.000200
SIGA-CR	18	x	0.000100		0.001800	0.000100	0.001800
SIGA-CT1	2	x	0.000250		0.000500	0.000400	0.000800
SIGA-WTM	2	x	0.000396		0.000792	0.000680	0.001360
SIGA-IPHS	121	x	0.000045		0.005445	0.000045	0.005445
SIGA-SD	7	x	0.000045		0.000315	0.000045	0.000315
SIGA-HRS	2	x	0.000045		0.000090	0.000045	0.000090
SIGA-278	9	x	0.000250		0.002250	0.000400	0.003600
757-1A-T Horn (Low Setting)	1	x	0.000000		0.000000	0.040000	0.040000
757-1A-T Horn (High Setting)	0	x	0.000000		0.000000	0.020000	0.000000
G1-HOV15	1	x	0.086000		0.086000	0.086000	0.086000
G1-HOV30	1	x	0.123000		0.123000	0.123000	0.123000
G1-HOV75	6	x	0.184000		1.104000	0.184000	1.104000
G1-HOV110	3	x	0.204000		0.612000	0.204000	0.612000
G1-V15	9	x	0.058000		0.522000	0.058000	0.522000
G1-V30	3	x	0.100000		0.300000	0.100000	0.300000
G1-V75	1	x	0.158000		0.158000	0.158000	0.158000
G1-V110	0	x	0.180000		0.000000	0.180000	0.000000
Total:					3.759638		4.208610
Battery Calculation	Time		Multiplier		Amp Hours		
Supervisory Hours	24	x	3.759638	=	90.231312		
Alarm Minutes	0.083	x	4.208610	=	0.34931463		
Total Amp Hours				=	90.580627		
Battery Used (AH)				=	40.000000		
Battery Spare (AH)				=	-50.580627		

Battery Calculations

FAPS-1

Description	Quantity		Standby (Amps)		Total Standby (Amps)	Alarm (Amps)	Total Alarm (Amps)
Power Supply	1	x	0.075000		0.075000	0.075000	0.075000
757-1A-T Horn (Low Setting)	0	x	0.000000		0.000000	0.040000	0.000000
757-1A-T Horn (High Setting)	3	x	0.000000		0.000000	0.020000	0.060000
G1-HOV15	5	x	0.000000		0.000000	0.086000	0.430000
G1-HOV30	2	x	0.000000		0.000000	0.123000	0.246000
G1-HOV75	11	x	0.000000		0.000000	0.184000	2.024000
G1-HOV110	3	x	0.000000		0.000000	0.204000	0.612000
G1-V15	18	x	0.000000		0.000000	0.058000	1.044000
G1-V30	2	x	0.000000		0.000000	0.100000	0.200000
G1-V75	0	x	0.000000		0.000000	0.158000	0.000000
G1-V110	0	x	0.000000		0.000000	0.180000	0.000000
Total:					0.075000		4.691000
Battery Calculation	Time		Multiplier		Amp Hours		
Supervisory Hours	24	x	0.075000	=	1.800000		
Alarm Minutes	0.083	x	4.691000	=	0.389353		
Total Amp Hours				=	2.189353		
Battery Used (AH)				=	7.000000		
Battery Spare (AH)				=	4.810647		

Battery Calculations

FAPS-2

Description	Quantity		Standby (Amps)		Total Standby (Amps)	Alarm (Amps)	Total Alarm (Amps)
Power Supply	1	x	0.075000		0.075000	0.075000	0.075000
757-1A-T Horn (Low Setting)	0	x	0.000000		0.000000	0.040000	0.000000
757-1A-T Horn (High Setting)	3	x	0.000000		0.000000	0.020000	0.060000
G1-HOV15	1	x	0.000000		0.000000	0.086000	0.086000
G1-HOV30	2	x	0.000000		0.000000	0.123000	0.246000
G1-HOV75	5	x	0.000000		0.000000	0.184000	0.920000
G1-HOV110	4	x	0.000000		0.000000	0.204000	0.816000
G1-V15	13	x	0.000000		0.000000	0.058000	0.754000
G1-V30	6	x	0.000000		0.000000	0.100000	0.600000
G1-V75	3	x	0.000000		0.000000	0.158000	0.474000
G1-V110	0	x	0.000000		0.000000	0.180000	0.000000
Total:					0.075000		4.031000
Battery Calculation	Time		Multiplier		Amp Hours		
Supervisory Hours	24	x	0.075000	=	1.800000		
Alarm Minutes	0.083	x	4.031000	=	0.334573		
Total Amp Hours				=	2.134573		
Battery Used (AH)				=	7.000000		
Battery Spare (AH)				=	4.865427		

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FACP Signal Circuit S1

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	1	x	0.085000		0.085000
G1-HOV30	1	x	0.123000		0.123000
G1-HOV75	4	x	0.184000		0.736000
G1-HOV110	1	x	0.204000		0.204000
G1-V15	4	x	0.058000		0.232000
G1-V30	1	x	0.100000		0.100000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	1.480000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	326
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	6.649

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-1 Signal Circuit S2

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	2	x	0.040000		0.080000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	1	x	0.086000		0.086000
G1-HOV30	1	x	0.123000		0.123000
G1-HOV75	2	x	0.184000		0.368000
G1-HOV110	1	x	0.204000		0.204000
G1-V15	2	x	0.058000		0.116000
G1-V30	1	x	0.100000		0.100000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	1.077000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	426
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	6.322

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-1 Signal Circuit S3

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	3	x	0.086000		0.258000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	3	x	0.184000		0.552000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	2	x	0.058000		0.116000
G1-V30	0	x	0.100000		0.000000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.926000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	368
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	4.696

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-1 Signal Circuit S4

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	1	x	0.040000		0.040000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	1	x	0.123000		0.123000
G1-HOV75	2	x	0.184000		0.368000
G1-HOV110	1	x	0.204000		0.204000
G1-V15	2	x	0.058000		0.116000
G1-V30	0	x	0.100000		0.000000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.851000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	407
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	4.773

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-1 Signal Circuit S5

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	1	x	0.086000		0.086000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	0	x	0.184000		0.000000
G1-HOV110	1	x	0.204000		0.204000
G1-V15	11	x	0.058000		0.638000
G1-V30	2	x	0.100000		0.200000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	1.128000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	508
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	7.896

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-2 Signal Circuit S6

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	1	x	0.086000		0.086000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	0	x	0.184000		0.000000
G1-HOV110	2	x	0.204000		0.408000
G1-V15	3	x	0.058000		0.174000
G1-V30	2	x	0.100000		0.200000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.868000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	259
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	3.098

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-2 Signal Circuit S7

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	3	x	0.184000		0.552000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	2	x	0.058000		0.116000
G1-V30	1	x	0.100000		0.100000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.768000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	348
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	3.683

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-2 Signal Circuit S8

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	1	x	0.040000		0.040000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	3	x	0.123000		0.369000
G1-HOV75	0	x	0.184000		0.000000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	3	x	0.058000		0.174000
G1-V30	1	x	0.100000		0.100000
G1-V75	1	x	0.158000		0.158000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.841000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	340
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	3.940

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FAPS-2 Signal Circuit S9

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	1	x	0.040000		0.040000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	1	x	0.184000		0.184000
G1-HOV110	2	x	0.204000		0.408000
G1-V15	0	x	0.058000		0.000000
G1-V30	0	x	0.100000		0.000000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.632000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	277
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	2.412

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FACP Signal Circuit S10

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	1	x	0.040000		0.040000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	2	x	0.184000		0.368000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	0	x	0.058000		0.000000
G1-V30	2	x	0.100000		0.200000
G1-V75	1	x	0.158000		0.158000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.766000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	442
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	4.666

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FACP Signal Circuit S11

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	0	x	0.040000		0.000000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	1	x	0.184000		0.184000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	5	x	0.058000		0.290000
G1-V30	0	x	0.100000		0.000000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.474000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	452
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	2.952

Worst Case Voltage Drop Calculations
RAMONA-ALESSANDRO ELEMENTARY SCHOOL
FACP Signal Circuit S12

Description	Quantity		Alarm (Amps)		Total Alarm (Amps)
757-1A-T Horn (High Setting)	1	x	0.040000		0.040000
757-1A-T Horn (Low Setting)	0	x	0.020000		0.000000
G1-HOV15	0	x	0.086000		0.000000
G1-HOV30	0	x	0.123000		0.000000
G1-HOV75	1	x	0.184000		0.184000
G1-HOV110	0	x	0.204000		0.000000
G1-V15	0	x	0.058000		0.000000
G1-V30	0	x	0.100000		0.000000
G1-V75	0	x	0.158000		0.000000
G1-V110	0	x	0.180000		0.000000
Total Current Draw:				=	0.224000
Wire Size 14	0	x	4110	=	0
Wire Size 12	1	x	6530	=	6530
Wire Used Circular Mills				=	6530
Distance to End of Circuit:				=	220
Multiplier				=	21.6
Voltage				=	24
Multiplier				=	4.166
Percentage Voltage Drop				=	0.679

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KEY PLAN

AGENCY APPROVAL

IDENTIFCATION STAMP
DIV. OF THE STATE ARCHITECT
04-106133
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DATE DEC 2 8 2007

PROJECT TITLE
SAN BERNARDINO CITY UNIFIED SCHOOL DISTRICT
777 NORTH "F" STREET
SAN BERNARDINO,CA. 92410

RAMONA-ALESSANDRO
ELEMENTARY SCHOOL
MODERNIZATION
670 RAMONA AVENUE
SAN BERNARDINO, CA 92411

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NO.	REVISIONS	DATE	NO.	REVISIONS	DATE

DRAWING TITLE
FIRE ALARM CALCULATIONS

ARCHITECT SEAL
LICENSED ARCHITECT CHRISTOPHER RICHARD TAYLOR NO. C-19759 REN. 02-24-09 STATE OF CALIFORNIA

DESIGNED ER	PROJECT NO. 31137117-000
DRAWN ER	SCALE NO SCALE
CHECKED JJR	DRAWING NO.
DATE	E-3.4