1" = 40'-0" 120 80 40 0

1" = 30'-0" 90 60 30 0

1" = 20'-0" 60 40 20 0

1/8" = 1'-0" 24 16 8 0

1/4" = 1'-0" 12 8 4 0

(N) FACP 'M' BATTERY CALCULATIONS

PROJECT:

QUANTITY	DEVICE/MODEL	SUPV. CURRENT	TOTAL SUPV. CURRENT	ALARM CURRENT	TOTAL ALARM CURRENT	ADD. NOTES
1	FACP	0.1660	0.1660	6.0000	6.0000	
1	EXISTING LOAD	0.8680	0.8680	0.0385	0.0385	
70	SMOKE & HEAT DETECTOR	0.0070	0.0910	0.0004	0.0052	
0	BEAM SMOKE DETECTORS	0.0280	0.0000	0.0385	0.0000	
0	V15	0.0000	0.0000	0.0600	0.0000	
0	V30	0.0000	0.0000	0.0920	0.0000	
0	V75	0.0000	0.0000	0.1650	0.0000	
0	V110	0.0000	0.0000	0.2200	0.0000	
0	AV15	0.0000	0.0000	0.0740	0.0000	
0	AV30	0.0000	0.0000	0.1070	0.0000	
0	AV75	0.0000	0.0000	0.1840	0.0000	
0	AV110	0.0000	0.0000	0.2440	0.0000	
0	WP	0.0000	0.0000	0.0610	0.0000	

	TOTALS	TOTAL SUPV. CURRENT	TOTAL ALARM CURRENT
SUPV. CURRENT X 24 HRS =	33.4800	1.3950	
ALARM CURRENT x 5 MINUTES =	0.5453		6.5437
TOTAL BATTERY STANDBY =	34.0253		

USE TWO 50AH 12 VDC BATTERIES

NOTE ABOVE CALCULATIONS COVER THE PERMANENT PORTABLES AND SPARE CAPACITY

FACP 'P1' BATTERY CALCULATIONS

PROJECT:

QUANTITY	DEVICE/MODEL	SUPV. CURRENT	TOTAL SUPV. CURRENT	ALARM CURRENT	TOTAL ALARM CURRENT	ADD. NOTES
1	FACP	0.1660	0.1660	6.0000	6.0000	
0	SCE	0.1660	0.0000	3.0000	0.0000	
112	SMOKE & HEAT DETECTOR	0.0070	0.7840	0.0004	0.0448	
0	BEAM SMOKE DETECTORS	0.0280	0.0000	0.0385	0.0000	
0	V15	0.0000	0.0000	0.0600	0.0000	
0	V30	0.0000	0.0000	0.0920	0.0000	
0	V75	0.0000	0.0000	0.1650	0.0000	
0	V110	0.0000	0.0000	0.2200	0.0000	
0	AV15	0.0000	0.0000	0.0740	0.0000	
0	AV30	0.0000	0.0000	0.1070	0.0000	
14	AV75	0.0000	0.0000	0.1840	2.5760	
0	AV110	0.0000	0.0000	0.2440	0.0000	
4	WP	0.0000	0.0000	0.0610	0.2440	

	TOTALS	TOTAL SUPV. CURRENT	TOTAL ALARM CURRENT
SUPV. CURRENT X 24 HRS =	22.8000	0.9500	
ALARM CURRENT x 5 MINUTES =	0.7387		8.8648
TOTAL BATTERY STANDBY =	23.5387		

USE TWO 33AH 12 VDC BATTERIES

SIGNALING CIRCUIT VOLTAGE DROP CALCULATIONS

CIRCUIT # S1

DEVICE LABEL	AV75	AV75	AV75	-	-	-	-	-	-	-	-
DEVICE NUMBER	2	3	4	-	-	-	-	-	-	-	-
WIRE GAGE	12	12	12	-	-	-	-	-	-	-	-
DISTANCE IN FEET	181.918	99.359	99.359	-	-	-	-	-	-	-	-
AMPS AT DEVICE	0.184	0.184	0.184	-	-	-	-	-	-	-	-
RUNNING AMPS	0.552	0.368	0.184	-	-	-	-	-	-	-	-
VOLTAGE DROP	0.369	0.134	0.067	-	-	-	-	-	-	-	-

% VOLTAGE DROP = 2.38 %

TOTAL DISTANCE = 380.64 FT

TOTAL VOLTAGE DROP = 0.57 VOLTS

CIRCUIT VOLTAGE = 24 VOLTS

FORMULA = (I X FEET X 24)/CIRC. MILS.

WIRE SIZE	/M FT.	CIRC. MILS.
10.000	1.018	10380
12.000	1.590	6530
14.000	2.520	4110
16.000	4.020	2580
18.000	6.390	1620
20.000	10.100	1020
22.000	16.200	640
24.000	25.700	404

SIGNALING CIRCUIT VOLTAGE DROP CALCULATIONS

CIRCUIT # S2

DEVICE LABEL	AV75	WP	AV75	AV75	AV75	-	-	-	-	-
DEVICE NUMBER	1	2	3	4	5	-	-	-	-	-
WIRE GAGE	12	12	12	12	12	-	-	-	-	-
DISTANCE IN FEET	251.046	0.500	99.359	99.359	99.359	-	-	-	-	-
AMPS AT DEVICE	0.184	0.061	0.184	0.184	0.184	-	-	-	-	-
RUNNING AMPS	0.858	0.674	0.552	0.368	0.184	-	-	-	-	-
VOLTAGE DROP	0.541	0.001	0.219	0.134	0.067	-	-	-	-	-

% VOLTAGE DROP = 4.75 %

TOTAL DISTANCE = 649.48 FT

TOTAL VOLTAGE DROP = 1.14 VOLTS

CIRCUIT VOLTAGE = 24 VOLTS

FORMULA = (I X FEET X 24)/CIRC. MILS.

WIRE SIZE	/M FT.	CIRC. MILS.
10.000	1.018	10380
12.000	1.590	6530
14.000	2.520	4110
16.000	4.020	2580
18.000	6.390	1620
20.000	10.100	1020
22.000	16.200	640
24.000	25.700	404

SIGNALING CIRCUIT VOLTAGE DROP CALCULATIONS

CIRCUIT # S3

DEVICE LABEL	WP	AV75	AV75	AV75	AV75	WP	-	-	-	-
DEVICE NUMBER	1	2	3	4	5	6	-	-	-	-
WIRE GAGE	12	12	12	12	12	12	-	-	-	-
DISTANCE IN FEET	59.650	42.000	168.357	168.357	168.357	0.500	-	-	-	-
AMPS AT DEVICE	0.061	0.184	0.184	0.184	0.184	0.061	-	-	-	-
RUNNING AMPS	0.858	0.797	0.613	0.429	0.245	0.061	-	-	-	-
VOLTAGE DROP	0.188	0.129	0.379	0.265	0.152	0.000	-	-	-	-

% VOLTAGE DROP = 4.62 %

TOTAL DISTANCE = 607.22 FT

TOTAL VOLTAGE DROP = 1.11 VOLTS

CIRCUIT VOLTAGE = 24 VOLTS

FORMULA = (I X FEET X 24)/CIRC. MILS.

WIRE SIZE	/M FT.	CIRC. MILS.
10.000	1.018	10380
12.000	1.590	6530
14.000	2.520	4110
16.000	4.020	2580
18.000	6.390	1620
20.000	10.100	1020
22.000	16.200	640
24.000	25.700	404

SIGNALING CIRCUIT VOLTAGE DROP CALCULATIONS

CIRCUIT # S4

DEVICE LABEL	AV75	WP	AV75	AV75	-	-	-	-	-	-
DEVICE NUMBER	1	2	3	4	-	-	-	-	-	-
WIRE GAGE	12	12	12	12	-	-	-	-	-	-
DISTANCE IN FEET	278.349	49.316	76.674	168.357	-	-	-	-	-	-
AMPS AT DEVICE	0.184	0.061	0.184	0.184	-	-	-	-	-	-
RUNNING AMPS	0.613	0.429	0.368	0.184	-	-	-	-	-	-
VOLTAGE DROP	0.627	0.078	0.104	0.114	-	-	-	-	-	-

% VOLTAGE DROP = 3.84 %

TOTAL DISTANCE = 572.70 FT

TOTAL VOLTAGE DROP = 0.92 VOLTS

CIRCUIT VOLTAGE = 24 VOLTS

FORMULA = (I X FEET X 24)/CIRC. MILS.

WIRE SIZE	/M FT.	CIRC. MILS.
10.000	1.018	10380
12.000	1.590	6530
14.000	2.520	4110
16.000	4.020	2580
18.000	6.390	1620
20.000	10.100	1020
22.000	16.200	640
24.000	25.700	404

CALIFORNIA CODE OF REGULATIONS (C.C.R)

PART 1	2007 CALIFORNIA BUILDING STANDARDS ADMINISTRATIVE CODE, TITLE 24 C.C.R.
PART 2	2007 CALIFORNIA BUILDING CODE, TITLE 24 C.C.R. (2006 INTERNATIONAL BUILDING CODE VOLUMES 1-3 OF THE INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS AND 2007 CALIFORNIA AMENDMENTS)
PART 3	2007 CALIFORNIA ELECTRICAL CODE, TITLE 24 C.C.R. (2006 NATIONAL ELECTRIC CODE OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NFPA AND 2007 CALIFORNIA AMENDMENTS)
PART 4	2007 CALIFORNIA MECHANICAL CODE, TITLE 24 C.C.R. (2006 UNIFORM MECHANICAL CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO AND 2007 CALIFORNIA AMENDMENTS)
PART 5	2007 CALIFORNIA PLUMBING CODE, TITLE 24 C.C.R (2006 UNIFORM PLUMBING CODE OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS, IAPMO AND 2007 CALIFORNIA AMENDMENTS)
PART 6	2007 CALIFORNIA ENERGY CODE, TITLE 24 C.C.R.
PART 7	2007 CALIFORNIA ELEVATOR SAFETY CONSTRUCTION CODE, TITLE 24 C.C.R.
PART 8	2007 CALIFORNIA HISTORICAL BUILDING CODE, TITLE 24 C.C.R.
PART 9	2007 CALIFORNIA FIRE CODE (2006 INTERNATIONAL FIRE CODE AND CALIFORNIA AMENDMENTS)
PART 10	2007 CALIFORNIA REFERENCE STANDARDS CODE, TITLE 24 C.C.R.
PART 12	TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

PARTIAL LIST OF APPLICABLE STANDARDS

2007 CALIFORNIA BUILDING CODE (FOR SFM) NATIONAL STANDARDS SECTION 3504.1.3

NFPA 13	AUTOMATIC SPRINKLER SYSTEMS	2002 EDITION
NFPA 14	STANDPIPE SYSTEMS	2007 EDITION
NFPA 17	DRY CHEMICAL EXTINGUISHING SYSTEMS	2002 EDITION
NFPA 17a	WET CHEMICAL EXTINGUISHING SYSTEMS	2002 EDITION
NFPA 20	STATIONARY PUMPS	2003 EDITION
NFPA 24	PRIVATE FIRE MAINS	2007 EDITION
NFPA 72	NATIONAL FIRE ALARM CODE (CALIF. AMENDED) (NOTE SEE UL STANDARD 1971 FOR `VISUAL DEVICES').	2007 EDITION
NFPA 253	CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS	2006 EDITION
NFPA 2001	CLEAN AGENT FIRE EXTINGUISHING SYSTEMS	2004 EDITION
ASME 17.1	ELEVATOR STANDARDS	2004 EDITION

REFERENCE CODE SECTION FOR NFPA STANDARDS - CBC (SFM) 3504.1

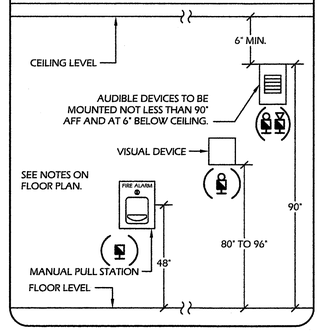
SYSTEM DESCRIPTION

1. THE SYSTEM SHOWN IS AN AUTOMATIC AND ADDRESSABLE SYSTEM.
2. CLASS B WIRING METHOD IS UTILIZED FOR ALL SIGNALING CIRCUITS.

SCOPE OF FIRE ALARM WORK

THE FIRE ALARM SYSTEM CONSISTS OF REPLACING THE EXISITING MAIN FIRE ALARM CONTROL PANEL. AUDIBLE/VISUAL DEVICES ARE USED FOR NOTIFICATION. ALL PERMANENT PORTABLES WILL HAVE AN AUTOMATIC AND ADDRESSABLE SYSTEM.

FIRE ALARM DEVICE ELEVATION DETAIL



FIRE ALARM SYMBOL LIST

SYMBOL	DEVICE TYPE	MANFACTURER/ MODEL NUMBER	CSFM LISTING NUMBER
	FACP	HOCHIKI #FIRENET 4127 WITH DIGITAL ALARM COM.	7170-0410:159
ANNUN	REMOTE ANNUNCIATOR	HOCHIKI #FN/LCD-N WITH SURFACE MOUNT BACK BOX	7120-0410:165
SD	SMOKE DETECTOR DETECTOR BASE	HOCHIKI #ALG-V HOCHIKI #YBN-NSA-4	7272-0410:149 7300-0410:132
	190°F FIXED HEAT DETECTOR DETECTOR BASE	HOCHIKI #DCD-190 HOCHIKI #YBN-NSA-4	7270-0410:151 7300-0410:132
MM	MONITOR MODULE	HOCHIKI #CZM	7300-0410:150
H/S	HORN/STROBE COMBINATION	WHEELOCK #NS-MCW-FR	7125-0785:142
H WP	WEATHERPROOF HORN	WHEELOCK #MT24-R	7135-0785:118
R	END OF LINE RESISTOR 3.9Kohm	VARIOUS	N/A

NOTES:
1. PROVIDE 16"x16" ACCESS PANEL(S) BENEATH ALL ATTIC HEAT DETECTOR LOCATIONS AT HARD CEILING.
2. PROVIDE MONITOR MODULE AT EACH 190°F FIXED HEAT DETECTOR.

FIRE ALARM SYSTEM NOTES

1. ALL WORK AND MATERIALS SHALL COMPLY WITH THE LATEST REGULATIONS OF THE STATE FIRE MARSHALL, CALIFORNIA CODE OF REGULATIONS, SERVING UTILITY COMPANIES AND OTHER APPLICABLE STATE ORDINANCES. NOTHING IN THESE PLANS OR SPECIFICATIONS IS TO BE CONSTRUED AS TO PERMIT WORK NOT CONFORMING TO THESE CODES. WHERE WORK OF A HIGHER DEGREE IS INDICATED IN THE PLANS OR SPECIFICATIONS THIS REQUIREMENT SHALL GOVERN.
2. THE FIRE ALARM SYSTEM DESIGN IS A "COMPLETE PLAN SUBMITTAL". THE CONTRACTOR SHALL INSTALL THE SYSTEM AS SHOWN AND AS HEREIN SPECIFIED.
3. ALARM INDICATING DEVICES OF A FIRE ALARM SYSTEM INTENDED TO ALERT ALL OCCUPANTS SHALL BE SO LOCATED AND UNOBSTRUCTED AS TO CAUSE A LEVEL OF AUDIBILITY OF NOT LESS THAN 15 DB ABOVE AMBIENT NOISE LEVELS MEASURED FOUR FEET ABOVE THE FLOOR INSIDE BUILDING. AMBIENT NOISE LEVELS SHALL BE CONSTRUED TO MEAN THAT WHICH CAN NORMALLY BE EXPECTED TO EXIST WHEN THE FACILITY, BUILDING, ROOM OR AREA IS FUNCTIONING UNDER NORMAL OPERATIVE OR WORKING CONDITIONS.
4. UPON COMPLETION OF THE INSTALLATION OF THE FIRE PROTECTIVE SIGNALLING EQUIPMENT, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF THE ENFORCING FIRE AGENCY PER CHAPTER 7, NFPA 72, AND A CERTIFICATE OF COMPLETION SHALL BE PROVIDED TO THE OWNER PER CHAPTER 1, NFPA 72 AND THE CALIFORNIA FIRE CODE, SECTION 1007.3.4.
5. AUDIBLE DEVICES SHALL HAVE TEMPORAL CODE 3 SOUND PATTERN.
6. ALL AUDIBLE AND VISUAL DEVICES SHALL BE SYNCHRONIZED.
7. ALL FIRE PROTECTION SIGNALING COMPONENTS SHALL BE ONLY THOSE APPROVED AND LISTED IN THE STATE FIRE MARSHAL'S LISTING SERVICE. AN ITEMIZED MATERIALS LIST SHOWING MAKE, MODEL NUMBER AND ITS CORRESPONDING STATE FIRE MARSHAL'S LISTING NUMBER SHALL BE FURNISHED TO THE PROJECT INSPECTOR. UPON COMPLETION OF THE INSTALLATION OF THE FIRE PROTECTIVE SIGNALING EQUIPMENT, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF THE LOCAL FIRE AUTHORITY WITH I.O.R. INSTALLATION REQUIREMENTS SHALL BE PER U.F.C., ARTICLE 10, SECTION 1001.

OPERATION MATRIX

INPUT	OUTPUT: DISPLAY GENERAL ALARM FACP	OUTPUT: INDICATE ZONE AT FACP	OUTPUT: DISPLAY SUPERVISON SIGNAL AT FACP	OUTPUT: ACTIVATE NOTIFICATION APPLIANCES	OUTPUT: NOTIFIY UL APPROVED MONITORING STATION	TROUBLE: ACTIVATE FACP AUDIBLE ALARM	TROUBLE: DISPLAY TROUBLE AT FACP
HEAT DETECTOR	●	●		●	●	●	●
SMOKE DETECTOR	●	●		●	●	●	●

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Revision:	Revision Description:	Rev. Date:

Sheet Title: FIRE ALARM SYMBOL LEGEND NOTES AND CALCULATIONS

Project Name & Address: FREMONT MAGNET ELEM. SCHOOL 14 CLASSROOM BLDG. BAKERSFIELD CITY SCHOOL DISTRICT 607 TEXAS ST. BAKERSFIELD, CA 93307

Issue Date:	Date:	Designer:	DR:	PC:

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