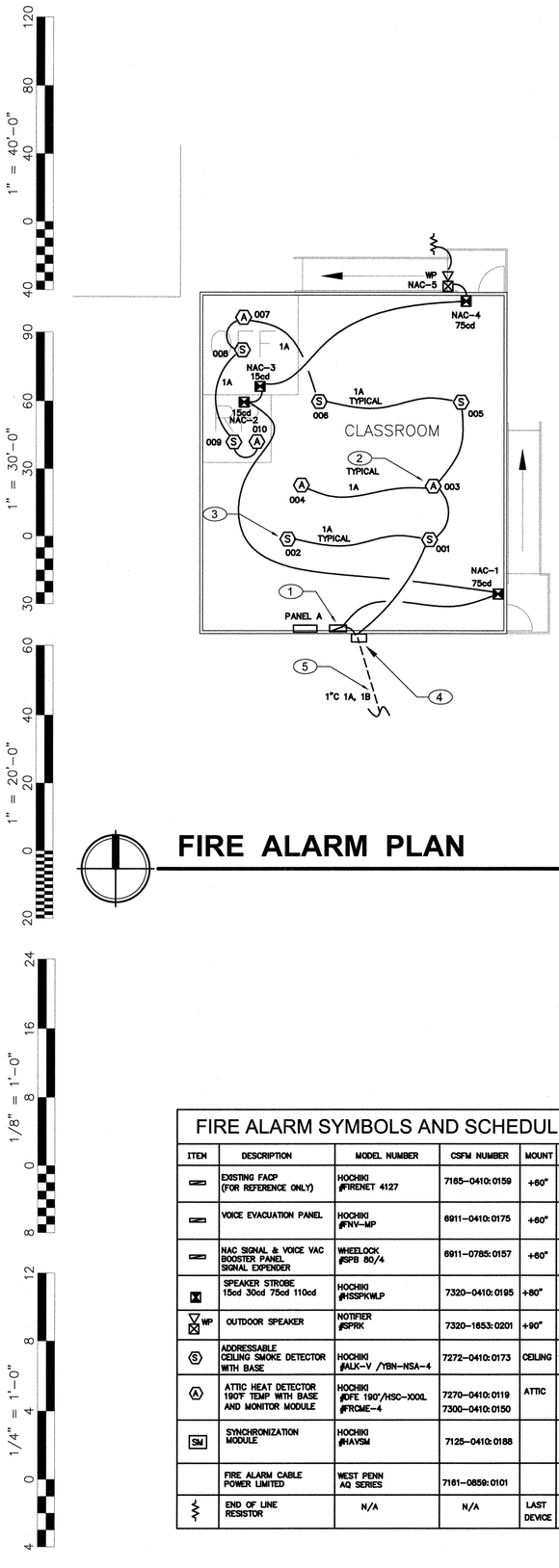


FIRE ALARM PLAN

SCALE : 1/8" = 1' – 0"

FIRE ALARM SYMBOLS AND SCHEDULE

ITEM	DESCRIPTION	MODEL NUMBER	CSFM NUMBER	MOUNT	BACK BOX
	EXISTING FACP (FOR REFERENCE ONLY)	HOCHIKI #FRENET 4127	7165-0410:0159	+60"	EQUIPMENT CABINET
	VOICE EVACUATION PANEL	HOCHIKI #FNV-MP	6911-0410:0175	+60"	EQUIPMENT CABINET
	NAC SIGNAL & VOICE VAC BOOSTER PANEL SIGNAL EXPENDER	WHEELOCK #SPB 80/4	6911-0785:0157	+60"	EQUIPMENT CABINET
	SPEAKER STROBE 15cd 30cd 75cd 110cd	HOCHIKI #ISSPKWLP	7320-0410:0195	+80"	4"SQ X 2 1/2"D
WP	OUTDOOR SPEAKER	NOTIFIER #SPRK	7320-1653:0201	+90"	4"SQ X 2 1/2"D
S	ADDRESSABLE CEILING SMOKE DETECTOR WITH BASE	HOCHIKI #ALK-V /YBN-NSA-4	7272-0410:0173	CEILING	4"SQ X 2 1/2"D
A	ATTIC HEAT DETECTOR 190°F TEMP WITH BASE AND MONITOR MODULE	HOCHIKI #DFE 190°/HSC-XXXL #FRCME-4	7270-0410:0119 7300-0410:0150	ATTIC	4"SQ X 2 1/2"D
SM	SYNCHRONIZATION MODULE	HOCHIKI #HAVSM	7125-0410:0188		4"SQ X 2 1/2"D
	FIRE ALARM CABLE POWER LIMITED	WEST PENN AQ SERIES	7161-0859:0101		CONDUIT
	END OF LINE RESISTOR	N/A	N/A	LAST DEVICE	4"SQ X 2 1/2"D

FIRE ALARM SEQUENCE OF OPERATIONS

	ACTIVATE ALARM FACP	ACTIVATE ALARM AT REMOTE ANNUNCIATOR	ACTIVATE TROUBLE SIGNAL AT FACP	ACTIVATE TROUBLE SIGNAL AT REMOTE ANNUNCIATOR	ACTIVATE SUPERVISORY SIGNAL AT FACP	ACTIVATE SUPERVISORY SIGNAL AT REMOTE ANNUNCIATOR	SEND ALARM OFF-SITE VIA COMMUNICATOR	SEND SUPERVISORY SIGNAL OFF-SITE VIA COMMUNICATOR	SEND SUPERVISORY SIGNAL OFF-SITE VIA COMMUNICATOR	ACTIVATE ALARM NAC SIGNALS	ACTIVATE WATER FLOW BELL	PRIMARY FLOOR RECALL	SECONDARY FLOOR RECALL	ELEVATOR SMART TRIP	ELEVATOR MACHINE TRIP	SHUT FIRE/SMOKE DAMPERS	CLOSE FIRE DOORS	RESET 120VAC INITIATING DEVICES	ACTIVATE BATTERY BACK-UP	ACTIVATE ALARM NAC SIGNALS	DEACTIVATE AUDIBLE SIGNALS	RESET 24V 4-WIRE DEVICES	SYSTEM NORMAL
MANUAL PULL STATION	X	X					X		X									X					
SMOKE DETECTORS:																							
ALL (EXCEPT LISTED BELOW)	X	X					X		X									X					
PRIMARY FLOOR LOBBY	X	X					X		X			X						X					
ALL OTHER LOBBIES	X	X					X		X		X							X					
ELEVATOR MACHINE ROOM	X	X					X		X			X						X					
ELEVATOR SHAFT	X						X		X		X							X					
HEAT DETECTORS:																							
ALL (EXCEPT LISTED BELOW)	X	X					X		X									X					
ELEVATOR MACHINE ROOM	X	X					X		X						X			X					
ELEVATOR SHAFT	X	X					X		X						X			X					
DUCT DETECTOR					X	X		X								X	X						
FIRE SPRINKLER WATERFLOW SWITCH	X	X					X			X	X							X					
FIRE SPRINKLER TAMPER SWITCH					X	X		X															
POST INDICATOR VALVE					X	X		X															
WIRING CONDITIONS:																							
SIGNALING LINE CIRCUIT (SLC)–																							
WIRE-TO-WIRE SHORT			X	X				X															
SINGLE OPEN			X	X				X															
SINGLE GROUND			X	X				X															
INITIATING DEVICE CIRCUIT (IDC)–																							
WIRE-TO-WIRE SHORT	X	X					X		X									X					
SINGLE OPEN			X	X				X															
SINGLE GROUND			X	X				X															
NOTIFICATION APPLIANCE CIRCUIT (NAC)–																							
WIRE-TO-WIRE SHORT			X	X																			
SINGLE OPEN			X	X																			
SINGLE GROUND			X	X																			
LOSS OF 120VAC POWER			X	X				X											X				
SIGNAL SILENCE																				X	X		
RESET FACP																			X	X	X	X	X

NOTE: SOME SEQUENCE OF OPERATIONS SHOWN MAY NOT APPLY

BATTERY POWER CALCULATIONS

NEW NAC SIGNAL & AUDIO BOOSTER PANEL

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE ALARM	STANDBY CURRENT	ALARM CURRENT
UNIT	1	0.120A	9A	0.120A	9A
OUTDOOR SPEAKER	1	---	0.050A	---	0.050A
MINI HORN	0	---	0.025A	---	0.000A
VISUAL 15cd	0	---	0.041A	---	0.000A
SPEAKER/STROBE 15cd	2	---	0.078A	---	0.156A
SPEAKER/STROBE 30cd	0	---	0.098A	---	0.000A
SPEAKER/STROBE 75cd	2	---	0.180A	---	0.360A
SPEAKER/STROBE 110cd	0	---	0.224A	---	0.000A
SYNC MODULES	1	---	0.045A	---	0.045A
SUB-TOTAL				0.120A	9.611A

24 HOUR STANDBY CURRENT	2.880AH
15 MINUTE ALARM CURRENT (0.25 HR)	2.403AH
SUBTOTAL	5.283AH
20% SAFETY FACTOR	1.057AH
TOTAL AMPS-HRS REQUIRED	6.340AH

PROVIDE BATTERY WITH (2) NEW 7AH BATTERY

DURING THE FINAL TESTING, MEASURE EXACT STANDBY AND ALARM CURRENT, VOLTAGE DROP FOR EACH SIGNAL CIRCUITS. SEND OWNER AND ENGINEER ONE COPY RECORD FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE CABINET DOOR.

BATTERY POWER CALCULATIONS

EXISTING FACP

DEVICE	NO. OF DEVICE FIELD MEASURE	CURRENT PER DEVICE STANDBY	CURRENT PER DEVICE LED	STANDBY CURRENT	LED CURRENT
EXISTING		0.3A	3.7A	0.3A	3.5A
SMOKE DETECTOR	6	0.0003A	0.0065A	0.0018A	0.039A
HEAT DETECTOR	4	0.0003A	0.0065A	0.0012A	0.026A
SUB-TOTAL				0.303A	3.565A

24 HOUR STANDBY CURRENT	7.272AH
15 MINUTE ALARM CURRENT (0.25 HR)	0.891AH
SUBTOTAL	8.163AH
20% SAFETY FACTOR	1.633AH
TOTAL NEW AMPS-HRS REQUIRED	9.798AH

REPLACE EXISTING BATTERY WITH (2)18AH BATTERIES

VOLTAGE DROP CALCULATION

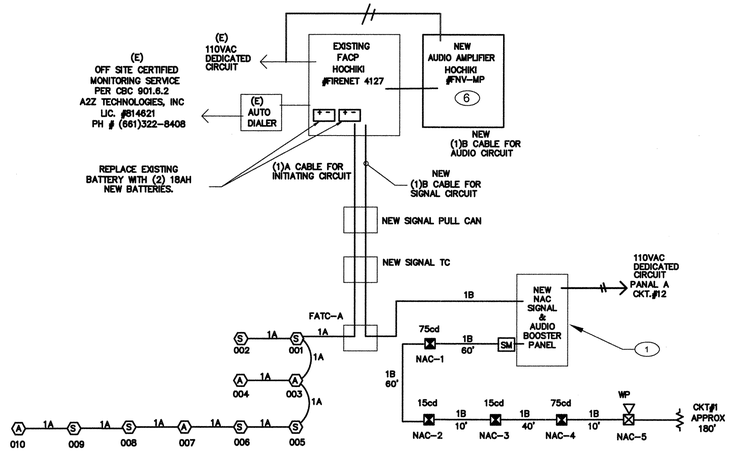
WORST CASE VOLTAGE DROP AT THE LAST DEVICE

VD = VOLTAGE DROP
I = TOTAL LOAD
K = 21.6
L = DISTANCE TO THE LOAD
CM = CIRCULAR MILLS (CROOS SECTION OF 12 AWG = 6530)
V = VOLTAGE (24vdc)
VD = $\frac{K \times I \times 2L}{CM}$

SIGNAL CKT NO.	AMPERES	APPROX LENGTH	RESISTIVITY OHM	WIRE AWG	AREA CM	VOLTS DROPPED	% VOLTS DROP
CKT. A	0.611A	180'	21.6	12	6530	0.364V	1.5%

SIGNAL CIRCUIT LOAD SUMMARY

	OUTDOOR SPEAKER 0.050A	VISUAL 15cd 0.041A	SPEAKER/STROBE 15cd 0.078A	SPEAKER/STROBE 30cd 0.098A	SPEAKER/STROBE 75cd 0.180A	SPEAKER/STROBE 110cd 0.224A	MINI HORN 0.025A	SYNC MODULE 0.045A	TOTAL
CKT. #	1	0	2	0	2	0	0	1	0.611A



NOTES:

1. RISER DIAGRAM IS DIAGRAMMATIC. SEE FIRE ALARM FLOOR PLAN AND FIELD VERIFY EXACT ROUTING AS REQUIRED.
2. ALL INTERIOR FIRE ALARM CONDUCTORS ARE INSTALLED IN EMT CONDUIT AND CONCEAL ABOVE CEILING OR INSIDE WALL WITH 3/4"C.
3. FIRE ALARM CONDUCTOR CANNOT SPLICE INSIDE PULL BOX. CONDUCTOR MUST BE CONTINUE RUN BETWEEN FIRE ALARM DEVICES BACK BOX OR TERMINAL CABINET.

1 FIRE ALARM RISER DIAGRAM

N.T.S

FA CABLE SCHEDULE

TYPE	DESCRIPTION
A	INITIALING CIRCUIT CABLE 2#16 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE. WEST PENN #D990 OR EQUAL. CSFM# 7161-0859:0101
B	NAC SIGNAL CIRCUIT CABLE 2#12 AWG SOLID COPPER THHN POWER LIMITED FPLR CABLE. WEST PENN #AQ227 PLUS 2#22 AWG SPEAKER CABLE OR EQUAL. CSFM# 7161-0859:0101

F.A. MONITORING NOTES

1. THE AUTOMATIC FIRE ALARM SYSTEMS SHALL TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION AS REQUIRED BY NFPA 72 AND AMENDED EITHER UUFX OR UUUS BY UNDERWRITERS OF FACTORY MUTUAL RESEARCH APPROVAL STANDARD 3011. SUPERVISION OF SYSTEM AND LEASED TELEPHONE LINES SHALL BY ARRANGED BY OWNER.

COMPLETE AUTOMATIC FIRE ALARM PLAN SUBMITTAL

1. THE FIRE ALARM SYSTEM SHOWN ON THESE PLANS HAS BEEN SUBMITTED AND APPROVED BY DIVISION OF THE STATE ARCHITECT. ANY SUBSTITUTION OF THE FIRE ALARM SYSTEM SHALL BE RESUBMITTED TO THE ARCHITECT FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL PAY ANY ADDITIONAL FEES THAT ARE INCURRED DUE TO THIS SUBSTITUTION.
2. THE AUTOMATIC FIRE ALARM SYSTEM SHALL COVER ALL ROOMS AND AREAS AND UPON ACTIVATION OF AN INITIATING DEVICE ALERT ALL OCCUPANTS AND TRANSMIT THE ALARM, SUPERVISORY, AND TROUBLE SIGNALS TO AN APPROVED SUPERVISING STATION. (EXCEPTION: SMOKE DETECTORS ARE NOT REQUIRED IN NON-ACCESSIBLE AREAS AS DEFINED IN EMERGENCY EXPRESS TERMS OF PROPOSED S.F.M. AMENDMENTS TO 2013 C.F.C. SECTION 210 (C.F.C. SECTIONS 1006.2.4.2.2.1.1 AND 1006.2.4.2.2.1.5)

SHEET NOTES

1. PROVIDE NEW FIRE ALARM SIGNAL AND AUDIO BOOSTER PANEL AND CONNECT TO (E) FACP PER RISER DIAGRAM. PROVIDE 110V POWER CONNECTION AND DEDICATED CIRCUIT FROM PANEL A-12. PROVIDE FIRE ZONE MAP, MEASURE ACTUAL LOAD CURRENT AND VOLTAGE DROP FOR EACH NAC SIGNAL CIRCUITS, AND STANDBY CURRENT AND ALARM CURRENT. SEND THE REPORT TO OWNER AND ENGINEER FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE CABINET DOOR. SEE FA RISER DIAGRAM FOR DETAIL.
2. LOCATE HEAT DETECTOR IN ATTIC AND SURFACE MOUNT ON THE BOTTOM OF RAFTER. DETECTOR COVERAGE WILL BE DERATED 50% ACROSS THE RAFTER. FIELD VERIFY LOCATION WITH GENERAL CONTRACTOR AND PROVIDE ATTIC HEAT DETECTOR IN EACH BAY OF STRUCTURAL.
3. LOCATE CEILING SMOKE DETECTOR 5 FEET FROM NAC SIGNAL EXPANDER PANEL.
4. NEW 6"x6"x4" NEMA3R FATC ON BUILDING EXTERIOR WALL. EXTEND NEW FA CONDUIT AND WIRING TO NEW BUILDINGS PER PLANS. FIELD VERIFY LOCATION.
5. NEW UNDERGROUND CONDUIT AND WIRING TO EXISTING SIGNAL TC. SEE SITE PLAN.
6. PROVIDE NEW FIRE ALARM DIGITAL VOICE COMMAND CENTER AND INTER CONNECT TO EXISTING FIRE ALARM CONTROL PANEL AND SURFACE MOUNT NEXT TO (E) FACP. FIELD VERIFY EXACT LOCATION.

F.A SYSTEM SCOPE OF WORK

1. PROVIDE AUTOMATIC FIRE ALARM SYSTEM WITH VOICE EVACUATION SPEAKERS FOR THE NEW CLASSROOM BUILDINGS PER PLANS.
2. EXISTING FACP IS 24VDC ADDRESSABLE, AND CLASS B WIRING SYSTEM, AND WITH OFF SITE MONITORING SERVICE VIA AUTO DUAL LINE DIALER AND TELEPHONE LINES.
3. DURING THE FINAL TESTING, MEASURE ALL FIRE ALARM CURRENTS, VOLTAGE DROP FOR EACH SIGNAL CIRCUITS. SEND OWNER AND ENGINEER ONE COPY RECORD FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE FACP CABINET DOOR.
4. COMPLETE FIRE ALARM DRAWING SUBMITTAL IS PROVIDED.

FIRE ALARM NOTES

1) APPLICABLE STANDARD 2013 NFPA 72
2) INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM HAS BEEN APPROVED BY DSA.
3) COMPLETION OF THE INSTALLATION OF THE SYSTEMS, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF A DSA PROJECT INSPECTOR.
4) A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
5) ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.
6) DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND /OR TESTING.
7) PENETRATIONS THROUGH RATED ASSEMBLIES, REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER LAB TESTING CRITERIA. APPROVED TYPE OF MATERIALS SHALL BE IDENTIFIED WITHIN THE SPECIFICATION WITHIN THE FIRE ALARM SECTION.
8) WALL MOUNTED VISUAL NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80" MINIMUM AND 96" MAXIMUM FROM FINISHED FLOOR.
9) WALL MOUNTED AUDIBLE NOTIFICATION DEVICES SHALL HAVE THEIR TOPS MOUNTED AT 90" MINIMUM AND 100" MAXIMUM FROM FINISHED FLOOR AND NO CLOSER THEN 6" TO A HORIZONTAL STRUCTURE.
10) AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (Dba) AVOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 Dba ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEASE 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIAVLE SPACE WITHIN THE BUILDING.
11) AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL CODE 3 PATTERN.
12) THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
13) VISUAL DEVICES SHOULD NOT EXCEED 2 FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN 1 FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELLA. VISUAL DEVICES WITHIN 55' FROM EACH OTHER SHALL BE SYNCHRONIZED.
14) UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATERTIGHT FITTINGS AND WIRE TO BE APPROVAL FOR WET LOCATIONS.
15) ALL FIRE ALARM WIRING SHALL BE FLP OR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
16) PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE. DO NOT SPLICE THE WIRE. ALL BOXES TO BE SIZED PER CEC.
17) SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1' FROM FIRE SPRINKLERS OR 3' FROM ANY SUPPLY DIFFUSER. IN AREA OF CONSTRUCTION OR POSSIBLE DAMAGE/CONTAMINATION ON NEWLY INSTALLED FIRE ALARM DEVICES SHALL BE COVERED UNTIL THAT AREA IS READY TO BE TURNED OVER TO THE OWNER.
18) ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19) FIRE ALARM PANEL, REMOTES, AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED THE WEIGHT OF 20 LBS. WITHOUT SPECIAL MOUNTING DETAILS.
20) A DEDICATED BRANCH CIRCUIT SHALL BE PROVIDED FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. THE BREAKER SHALL HAVE A RED LOCKING DEVICE TO BLOCK THE HANDLE IN THE 'ON' POSITION. THE CIRCUIT BREAKER SHALL BE LABELED 'FIRE ALARM CIRCUIT CONTROL'. CIRCUIT ID TO BE LABELED AT FIRE PANEL/EXTENDERS.
21) THE INSTALLING CONTRACTOR SHALL PROVIDE A RECORD OF COMPLETION PER NFPA 72, FIGURE 10.18.2.1.1.
22) CONTROL PANELS, REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS MOUNTED AT 48"
23) THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2.
24) SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST.
25) OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.

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Revision:	Revision Description:	Rev. Date:

Sheet Title: FIRE ALARM PLAN

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Issue Date:	Designer:	DR:	PC:
00/00/14	J CHONG	J CHONG	CJM
Date: 05/28/14			

Agency Approval Stamp:

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