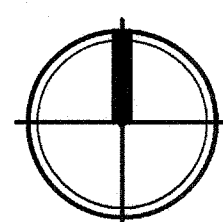
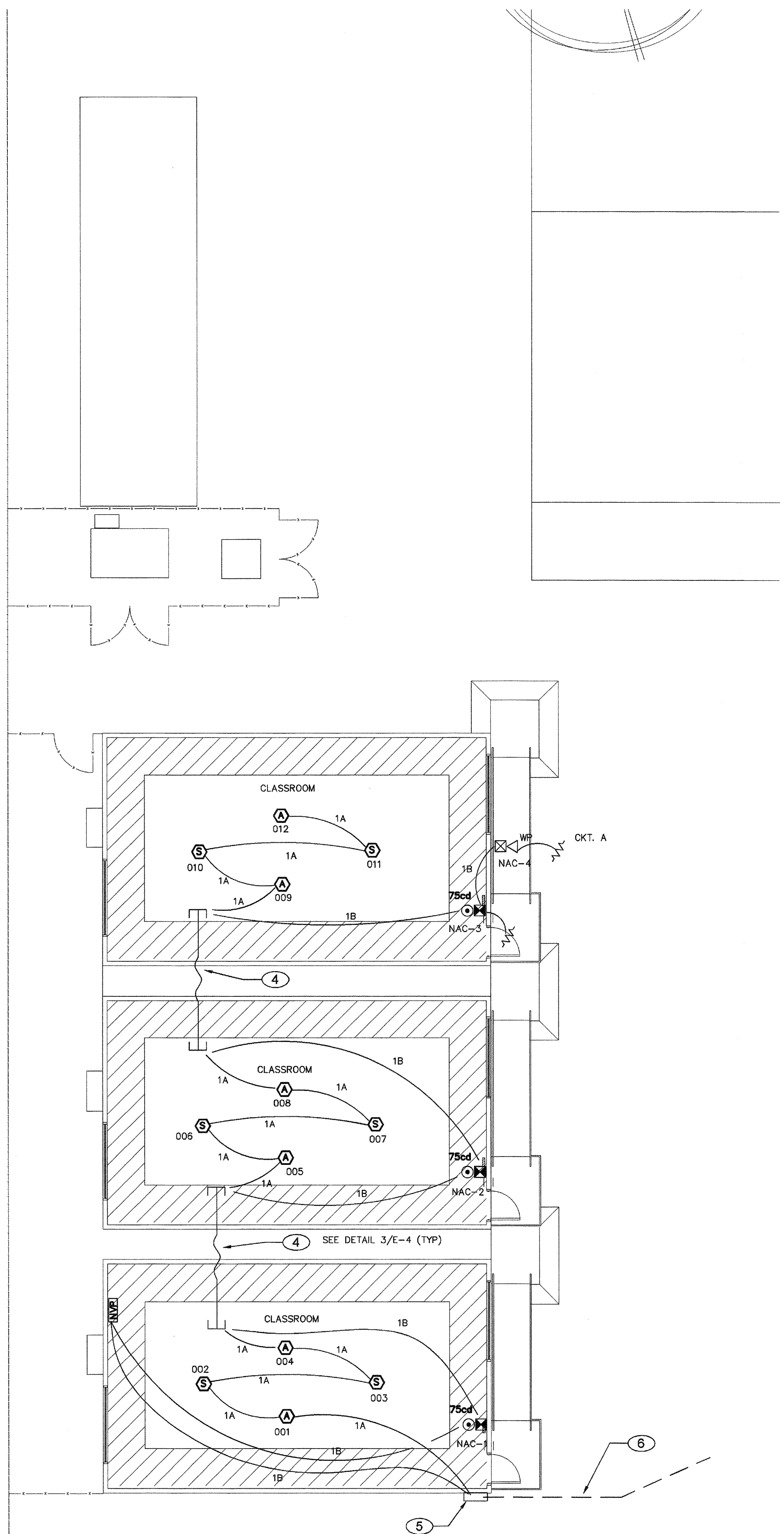


1" = 40'-0"
 1" = 30'-0"
 1" = 20'-0"
 1" = 1'-0"
 1/8" = 1'-0"
 1/4" = 1'-0"



FIRE ALARM PLAN

SCALE : 1/8" = 1' - 0"



FIRE ALARM SYMBOLS AND SCHEDULE

ITEM	DESCRIPTION	MODEL NUMBER	CSFM NUMBER	MOUNT	BACK BOX
FACP	EXISTING FACP (FOR REFERENCE ONLY)	HOCHIKI #FIRENET 4127	7165-0410:0159	+60"	EQUIPMENT CABINET
VEP	EXISTING VOICE EVACUATION PANEL (FOR REFERENCE ONLY)	HOCHIKI #EVAC 50	6911-0410:0176	+60"	EQUIPMENT CABINET
NVP	NAC SIGNAL & VOICE VAC BOOSTER PANEL SIGNAL EXPENDER	WHEELOCK #SPB 80/4	6911-0785:0157	+60"	EQUIPMENT CABINET
S	SPEAKER STROBE	HOCHIKI #HSSPKWLP	7320-0410:0195	+80"	4"SQ X 2 1/2"D
WP	OUTDOOR SPEAKER WITH WEATHER PROOF BOX	HOCHIKI #WHE 24WR #HGOE	7135-0410:0187 7300-0410:0189	+80"	4"SQ X 2 1/2"D
S	ADDRESSABLE CEILING SMOKE DETECTOR WITH BASE	HOCHIKI #ALK-V #BYN-NSA-4	7272-0410:0173 7300-0410:0132	CEILING	4"SQ X 2 1/2"D
A	ATTIC HEAT DETECTOR 190T TEMP WITH BASE AND MONITOR MODULE	HOCHIKI #DPE 190/HSC-XXL #FRME-4	7270-0410:0119 7300-0410:0150	ATTIC	4"SQ X 2 1/2"D
	FIRE ALARM CABLE POWER LIMITED	WEST PENN AUI SERIES	7161-0859:0101		
~V~	END OF LINE RESISTOR	N/A	N/A	LAST DEVICE	4"SQ X 2 1/2"D

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 (GROSS SECTION OF 12 AWG = 6530)
 V = VOLTAGE (24Vdc)
 $VD = \frac{K \cdot I \cdot L}{CM}$

SIGNAL NO.	AMPERES	APPROX LENGTH	RESISTIVITY OHM	WIRE AWG	AREA CM	VOLTS DROPPED	% VOLTS DROP
OKT# A STROBE	0.521A	220'	21.6	12	6530	0.396V	1.7%
OKT# A SPEAKER	0.040A	230'	21.6	12	6530	0.030V	0.1%

FA CABLE SCHEDULE

TYPE	DESCRIPTION
A	INITIATING CIRCUIT CABLE 2#16 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, FOR INDOOR AND OUTDOOR VIA MIN. 3/4" CONDUIT INSTALLATION
B	NAC SIGNAL CIRCUIT CABLE 2#12 AWG SOLID COPPER PVC JACKET POWER LIMITED FPLR CABLE, AND SPEAKER CIRCUIT CABLE 2#18 AWG SHIELDED COPPER PVC JACKET POWER LIMITED FPLR CABLE FOR INDOOR AND OUTDOOR VIA MIN. 3/4" CONDUIT INSTALLATION

BATTERY POWER CALCULATIONS

NEW NAC SIGNAL & VOICE BOOSTER PANEL A

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE	STANDBY CURRENT	ALARM CURRENT
OUTDOOR SPEAKER	1	---	0.050A	---
VISUAL 15cd	0	---	0.041A	---
VISUAL 30cd	0	---	0.063A	---
AUDIO/VISUAL 30cd	0	---	0.093A	---
AUDIO/VISUAL 75cd	3	---	0.114A	---
AUDIO/VISUAL 110cd	0	---	0.157A	---
SYNC MODULES	0	---	0.197A	---
1/4W SPEAKER	3	---	0.035A	---
1/4W SPEAKER	3	---	0.010A	---
SUB-TOTAL			0.120A	1.451A

24 HOUR STANDBY CURRENT 2.880AH
 15 MINUTE ALARM CURRENT (0.25 HR) 0.363AH
 SUBTOTAL 3.243AH

20% SAFETY FACTOR 0.649AH
 TOTAL AMPS-HRS REQUIRED 3.892AH
 PROVIDE BATTERY WITH (2) NEW 12AH 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 FIRE ALARM CONTROL PANEL (FACP) IN EXISTING ADMIN BUILDING

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE	STANDBY CURRENT	LED CURRENT
EXISTING ESTIMATE LOAD	1	---	0.25A	3.5A
NEW SMOKE DETECTOR	6	0.0003A	0.0065A	0.0018A
NEW HEAT DETECTOR	6	0.0003A	0.0065A	0.0018A
SUB-TOTAL			0.2536A	3.578A

24 HOUR STANDBY CURRENT 6.000AH
 15 MINUTE LED CURRENT (0.25 HR) 0.895AH
 SUBTOTAL 6.895AH

20% SAFETY FACTOR 1.379AH
 TOTAL NEW AMPS-HRS REQUIRED 8.274AH

REPLACE EXISTING BATTERIES WITH (2) NEW 18AH BATTERIES

BATTERY POWER CALCULATIONS

EXISTING AUDIO AMPLIFIER NOTIFIER#VVC IN EXISTING ADMIN BUILDING

DEVICE	NO. OF DEVICE	CURRENT PER DEVICE	STANDBY CURRENT	ALARM CURRENT
EXISTING UNIT	1	0.130A	1.000A	0.130A
NEW BOOSTER PNL	1	0.130A	1.000A	0.130A
SUB-TOTAL			0.260A	2.000A

24 HOUR STANDBY CURRENT 6.240AH
 15 MINUTE ALARM CURRENT (0.25 HR) 0.500AH
 SUBTOTAL 6.740AH

20% SAFETY FACTOR 1.348AH
 TOTAL NEW AMPS-HRS REQUIRED 8.088AH
 REPLACE EXISTING BATTERY WITH (2) NEW 12AH BATTERIES

F.A. MONITORING NOTES

- 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 ULXF OR ULUS 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

- 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.
- 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 2016 C.F.C. SECTION 210 (C.F.C. SECTIONS 1006.2.4.2.1.1 AND 1006.2.4.2.1.5)

SHEET NOTES

- EXISTING ADDRESSABLE FIRE ALARM CONTROL PANEL IN ADMIN OFFICE TO REMAIN. PROVIDE CONNECTION TO NEW FIRE ALARM DEVICES PER PLANS. UPDATE NEW FIRE ZONE MAP AND PROGRAM NEW DEVICES INFORMATION. MEASURE ACTUAL LOAD CURRENT AND VOLTAGE DROP FOR EACH NAC SIGNAL CIRCUITS, AND FACP STANDBY CURRENT AND ALARM CURRENT. SEND THE REPORT TO OWNER AND ENGINEER FOR REVIEW, AND PLASTIC LAMINATED ONE COPY INSIDE CABINET DOOR.
- EXISTING EMERGENCY VOICE EVA PANEL IN ADMIN OFFICE TO REMAIN. FIELD VERIFY LOCATION. PROVIDE NEW VOICE CIRCUITS TO NEW BUILDING VIA NEW SIGNAL AND VOICE BOOSTER COMBO PANEL PER PLANS.
- NEW FA NAC SIGNAL AND AUDIO BOOSTER PANEL-A. PROVIDE 110V DEDICATED CIRCUIT FROM PANEL A CIRCUIT NO. 12.
- PROVIDE 1"Ø FLEX WP CONDUIT BETWEEN BUILDING IN ATTIC SPACE FOR FA WIRING RACEWAY. CORE DRILL AND SEAL EXTERIOR WALL AS REQUIRED. SEE DETAIL 3/E-4.
- 24"x24"x4" NEMA2R SIGNAL TO SURFACE MOUNT ON BUILDING EXTERIOR WALL WITH (2)2"Ø STUB INTO BUILDING ATTIC SPACE.
- SAW CUT AND PATCH EXISTING AC PAVING TO BUILDING EXTERIOR WALL WITH (2)2"Ø STUB INTO BUILDING FACP AND VOICE PANELS IN ADMIN OFFICE. PATCH BACK TO MATCH EXISTING.

F.A SYSTEM SCOPE OF WORK

- PROVIDE AUTOMATIC FIRE ALARM SYSTEM AND DEVICES FOR THE NEW BUILDINGS PER PLANS.
- INSTALL NEW SIGNAL & VOICE COMBO BOOSTER PANEL AND ASSOCIATED CIRCUITS AND FA DEVICES.
- EXISTING FACP IN ADMIN. OFFICE IS 24VDC ADDRESSABLE, AND CLASS B WIRING SYSTEM, AND WITH OFF SITE MONITORING SERVICE VIA AUTO DUAL LINE DIALER AND TELEPHONE LINES.
- 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.

FIRE ALARM NOTES

- APPLICABLE STANDARD 2016 NFPA 72
- 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.
- 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.
- A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
- 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.
- DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND /OR TESTING.
- 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.
- WALL MOUNTED VISUAL NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80" MINIMUM AND 96" MAXIMUM FROM FINISHED FLOOR.
- 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.
- AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (Dba) ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR 5 Dba ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPABLE SPACE WITHIN THE BUILDING.
- UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATERTIGHT FITTINGS AND WIRE TO BE APPROVAL FOR WET LOCATIONS.
- ALL FIRE ALARM WIRING SHALL BE FLP OR FLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE THHN OR THWN.
- PER CBC 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.
- 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.
- 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 MANNER AS INDICATED ON DESIGN DOCUMENTS. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
- 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.
- 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.
- THE INSTALLING CONTRACTOR SHALL PROVIDE A RECORD OF COMPLETION PER NFPA 72, FIGURE 10.18.2.1.1.
- CONTROL PANELS, REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS MOUNTED AT 48"
- THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2.
- SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST.
- OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.

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 Revision:
 Rev. Date:

FIRE ALARM PLAN

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Issue Date: 00/00/17
 Date: 06/05/17
 Designer: J CHONG
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