

SYSTEM OVERVIEW

- Addressable Fire Alarm System (NFPA 72 Compliant)
- Distributed Network Architecture
- Class A SLC Loops
- Class A NAC Circuits
- Redundant Fiber Network
- Centralized Monitoring & Control
- Integrated Life Safety Systems

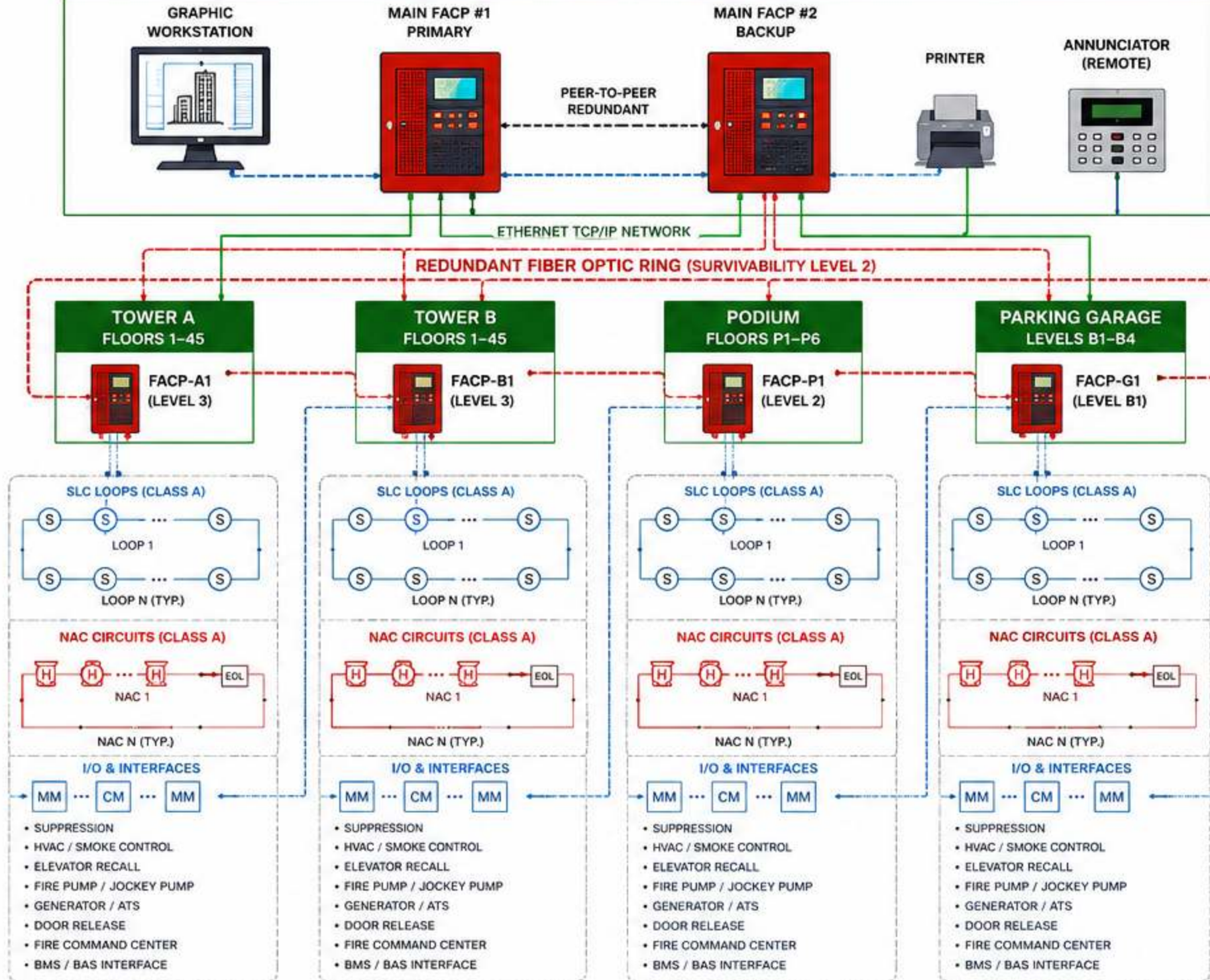
LEGEND

- FIBER OPTIC (REDUNDANT RING)
- ETHERNET (TCP/IP)
- RS-485 / PANEL BUS
- SLC LOOP (CLASS A)
- NAC CIRCUIT (CLASS A)
- FACP - FIRE ALARM CONTROL PANEL
- RA - REMOTE ANNUNCIATOR
- SP - SATELLITE PANEL
- S - SLC DEVICE
- H - HORN / STROBE
- SPK - SPEAKER
- M - MANUAL PULL STATION
- MM - MONITOR MODULE
- CM - CONTROL MODULE
- EOL - END OF LINE RESISTOR

NOTES

1. ALL SLC LOOPS ARE CLASS A.
2. ALL NAC CIRCUITS ARE CLASS A.
3. FIBER RING PROVIDES SURVIVABILITY LEVEL 2.
4. EACH FACP SUPERVISES LOCAL LOOPS, NACs AND INTERFACES.
5. ALL PANELS ARE UL 864 10th EDITION LISTED.

FIRE COMMAND CENTER (LEVEL 2)



SYSTEM STATISTICS

TOTAL FLOORS	45 (2 TOWERS)
TOTAL AREA	~2.3 MILLION SQ FT
TOTAL FACP's	4
TOTAL SLC LOOPS	96
TOTAL NAC CIRCUITS	128
TOTAL DEVICES (EST.)	18,500+
NETWORK ARCHITECTURE	FIBER RING
SURVIVABILITY LEVEL	2

SYSTEM FEATURES

- RELIABLE & REDUNDANT
- DISTRIBUTED INTELLIGENCE
- FAST ALARM DETECTION
- CLEAR VOICE EVACUATION
- INTEGRATED SMOKE CONTROL
- EMERGENCY POWERED
- CODE COMPLIANT (NFPA 72)
- EASY MAINTENANCE
- CYBERSECURE NETWORK

INTEGRATED LIFE SAFETY SYSTEMS

- SPRINKLER SYSTEM
- SMOKE CONTROL SYSTEM
- ELEVATOR RECALL
- EMERGENCY COMMUNICATION
- VOICE EVAC SYSTEM
- EMERGENCY POWER
- DOOR RELEASE SYSTEM
- BMS / BAS INTEGRATION

SKYLINE TOWER COMPLEX FIRE ALARM & LIFE SAFETY SYSTEM SYSTEM ARCHITECTURE

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1

LEGEND

- FIBER OPTIC (REDUNDANT RING)
- ETHERNET (TCP/IP)
- SLC LOOP (CLASS A)
- NAC CIRCUIT (CLASS A)
- RS-485 / PANEL BUS

- FACP FIRE ALARM CONTROL PANEL
- RA REMOTE ANNUNCIATOR
- SP SATELLITE PANEL
- S SLC LOOP
- N NAC CIRCUIT
- MM MONITOR MODULE
- CM CONTROL MODULE
- FIBER TERMINATION / NODE

NOTES

- ALL SLC LOOPS ARE CLASS A.
- ALL NAC CIRCUITS ARE CLASS A.
- FIBER RING PROVIDES SURVIVABILITY LEVEL 2.
- SLC AND NAC WIRING SHOWN TYPICAL FOR EACH FLOOR.
- FLOOR COUNT INCLUDES MECHANICAL AND ROOF LEVELS.
- PANEL LOCATIONS MAY VARY SLIGHTLY TO COORDINATE WITH ARCHITECTURAL LAYOUT.

CABLE SUMMARY (RISER)

CABLE TYPE	QTY (RISER)
FIBER OPTIC (MM OM3)	2 x 12 STRAND
CAT6A (ETHERNET)	2
FPLP / FPLR (SLC)	96 PAIRS
FPLP / FPLR (NAC)	128 PAIRS
RS-485 (PANEL BUS)	8 PAIRS

RISER NOTES

- ALL CABLES TO BE IN FIRE RATED RISER SHAFTS.
- MAINTAIN 25% SPARE CAPACITY IN CONDUITS.
- FOLLOW NFPA 72 CHAPTER 12 FOR WIRING METHODS.
- SEPARATE POWER CIRCUITS FROM SIGNAL CIRCUITS.

ABBREVIATIONS

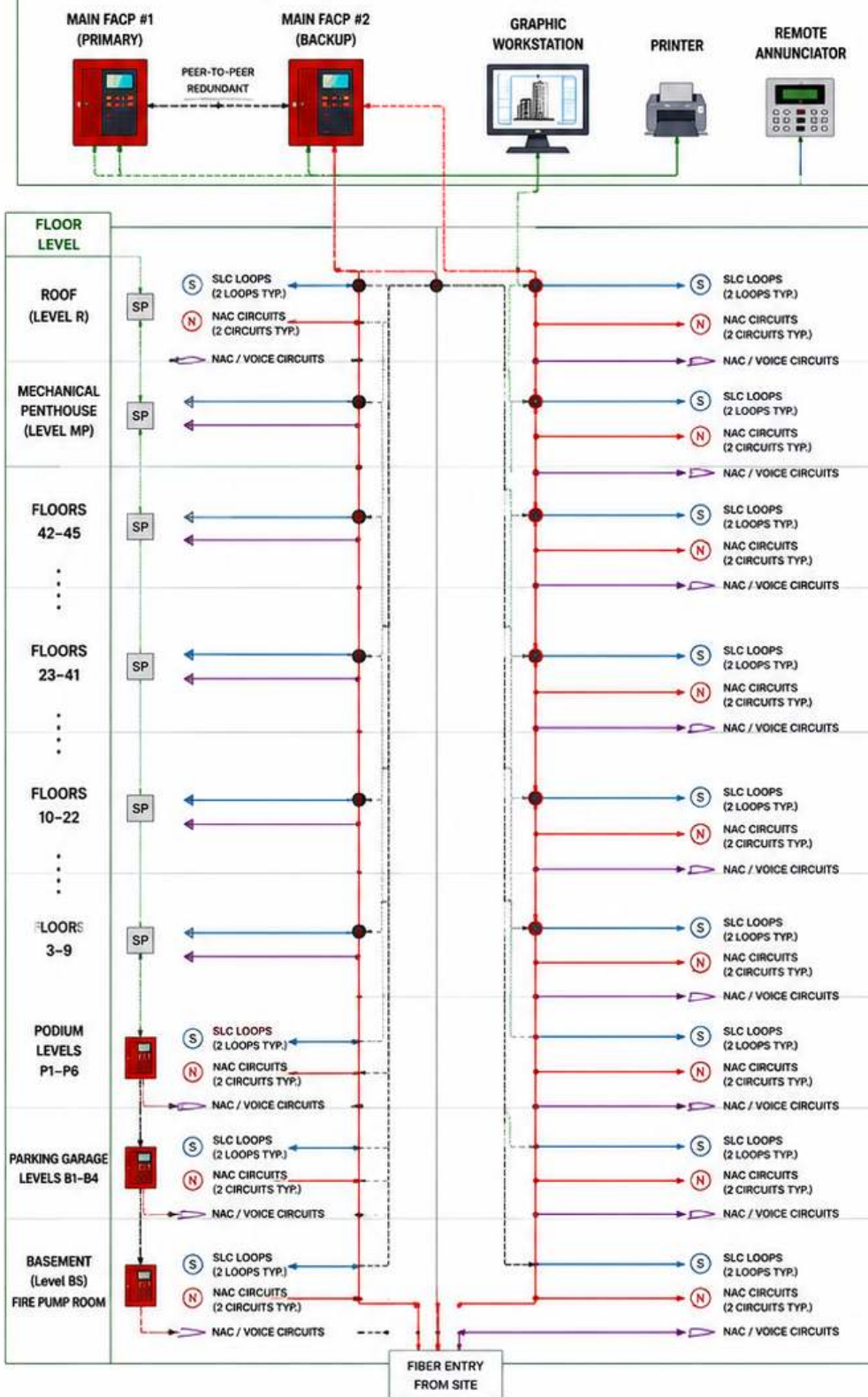
FACP	Fire Alarm Control Panel
SLC	Signaling Line Circuit
NAC	Notification Appliance Circuit
RA	Remote Annunciator
SP	Satellite Panel

SYSTEM SUMMARY

TOTAL FLOORS:	45 (INCLUDING ROOF & BASEMENT)
TOTAL NETWORK NODES:	16
TOTAL SLC LOOPS:	96
TOTAL NAC CIRCUITS:	128
NETWORK ARCHITECTURE:	FIBER RING (SURVIVABILITY LEVEL 2)
WIRING CLASS:	CLASS A

SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
NETWORK RISER DIAGRAM

FIRE COMMAND CENTER (LEVEL 2)



RISER DESCRIPTION

This riser diagram shows the vertical distribution of the fire alarm network for the Skyline Tower Complex.

- Dual fiber optic ring (redundant) connects all network nodes.
- Each network node provides SLC loops and NAC circuits for its respective floors.
- Panels are located in electrical rooms on each group of floors.
- All wiring methods per NFPA 72 and local codes.

FLOOR INDEX

LEVEL	DESCRIPTION
R	ROOF
MP	MECHANICAL PENTHOUSE
45	FLOOR 45
44	FLOOR 44
43	FLOOR 43
42	FLOOR 42
...	...
23	FLOOR 23
22	FLOOR 22
...	...
10	FLOOR 10
9	FLOOR 9
8	FLOOR 8
...	...
3	FLOOR 3
2	FLOOR 2
1	FLOOR 1
P6	PODIUM LEVEL 6
P1	PODIUM LEVEL 1
B1	PARKING LEVEL B1
B4	PARKING LEVEL B4
B5	BASEMENT (FIRE PUMP ROOM)

WIRING NOTES

- MAINTAIN 1" MIN. SEPARATION BETWEEN POWER AND SIGNAL CIRCUITS.
- ALL CIRCUITS ARE POWER LIMITED.
- PROVIDE FIRESTOP AT EACH FLOOR PENETRATION.
- LABEL ALL CABLES AT BOTH ENDS.

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CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

FACP NETWORK TOPOLOGY

FIRE ALARM CONTROL PANEL NETWORK ARCHITECTURE
SHOWING PRIMARY FACP, SATELLITE PANELS, REMOTE ANNUNCIATORS,
AND NETWORK COMMUNICATIONS

DRAWING NUMBER

FA-DRW-003

REV: 0

DATE: 05/15/2024

LEGEND

- FIBER OPTIC (REDUNDANT RING)
- ETHERNET (TCP/IP)
- RS-485 (PANEL BUS)
- SLC LOOP (CLASS A)
- NAC CIRCUIT (CLASS A)
- AUDIO LINK
- DRY CONTACT / I/O

- FACP FIRE ALARM CONTROL PANEL
- RA REMOTE ANNUNCIATOR
- SP SATELLITE PANEL
- WS WORKSTATION
- PRN PRINTER
- NMS NETWORK MANAGEMENT SYSTEM
- GW GATEWAY / INTERFACE
- MB MODBUS GATEWAY
- BMS BUILDING MANAGEMENT SYSTEM

NOTES

- NETWORK ARCHITECTURE IS FIBER RING TOPOLOGY WITH AUTOMATIC FAILOVER.
- FACP #1 AND FACP #2 ARE PEER-TO-PEER SYNCHRONIZED.
- ALL PANELS ARE ON SAME SUBNET WITH UNIQUE IP ADDRESSES.
- RS-485 PANEL BUS USED FOR SATELLITE PANELS AND REMOTE ANNUNCIATORS.
- ALL WIRING AND DEVICES PER NFPA 72.

FIRE COMMAND CENTER (LEVEL 2)

MAIN FACP #1
(PRIMARY)

MAIN FACP #2
(BACKUP)

GRAPHIC
WORKSTATION

NETWORK
MANAGEMENT
SYSTEM

PRINTER

REMOTE
ANNUNCIATOR
(RA-CC-01)

PEER-TO-PEER
REDUNDANT
SYNC.

REDUNDANT FIBER OPTIC RING
(SURVIVABILITY LEVEL 2)

TOWER A
FLOORS 1-45

TOWER B
FLOORS 1-45

PODIUM
LEVELS P1-P6

PARKING GARAGE
LEVELS B1-B4

SP-A01
(LEVEL 3)

SP-B01
(LEVEL 3)

SP-P01
(LEVEL 2)

SP-G01
(LEVEL B1)

RA-A01 RA-A02 ... RA-A06

RA-B01 RA-B02 ... RA-B06

RA-P01 RA-P02 ... RA-P04

RA-G01 RA-G02 ... RA-G04

SLC LOOPS (CLASS A)

SLC LOOPS (CLASS A)

SLC LOOPS (CLASS A)

SLC LOOPS (CLASS A)

NAC CIRCUITS (CLASS A)

NAC CIRCUITS (CLASS A)

NAC CIRCUITS (CLASS A)

NAC CIRCUITS (CLASS A)

AUDIO / NFS LINK

AUDIO / NFS LINK

AUDIO / NFS LINK

AUDIO / NFS LINK

EXTERNAL SYSTEM
INTEGRATION

GW-01
BMS GATEWAY

GW-02
MODBUS GATEWAY

BMS

MB

NETWORK CONNECTION SUMMARY

TOTAL FACP's	2
SATELLITE PANELS	12
REMOTE ANNUNCIATORS	24
GRAPHIC WORKSTATIONS	2
NETWORK MANAGEMENT	1
PRINTERS	1
GATEWAYS	2 (BMS, MODBUS)

IP ADDRESS SCHEME

DEVICE TYPE	IP RANGE
FACP's	10.10.1.10 - 10.10.1.20
SATELLITE PANELS	10.10.1.30 - 10.10.1.60
REMOTE ANNUNCIATORS	10.10.1.70 - 10.10.1.120
WORKSTATIONS	10.10.1.130 - 10.10.1.140
NMS / SERVERS	10.10.1.150
GATEWAYS	10.10.1.160 - 10.10.1.170

NETWORK FEATURES

- ✓ PEER-TO-PEER FACP COMMUNICATION
- ✓ REDUNDANT FIBER OPTIC RING
- ✓ AUTOMATIC NETWORK FAILOVER
- ✓ SYNCHRONIZED EVENT DATABASE
- ✓ TIME SYNCHRONIZATION (NTP)
- ✓ SECURE VLAN SEGMENTATION

EXTERNAL CONNECTIONS

MONITORING STATION



IP / SIA

AHJ / FIRE DEPT.



IP / SIA

MASS NOTIFICATION
SYSTEM



IP / SIP

ELEVATOR CONTROL
SYSTEM



DRY CONTACT

VOICE EVAC SYSTEM



AUDIO LINK

DOOR ACCESS
SYSTEM



DRY CONTACT

EMERGENCY POWER
SYSTEM



DRY CONTACT

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM
FIRE ALARM NETWORK TOPOLOGY
FACP NETWORK ARCHITECTURE

DRAWN BY:

AEG

CHECKED BY:

AEG

APPROVED BY:

AEG

SCALE:

N.T.S.

SHEET:

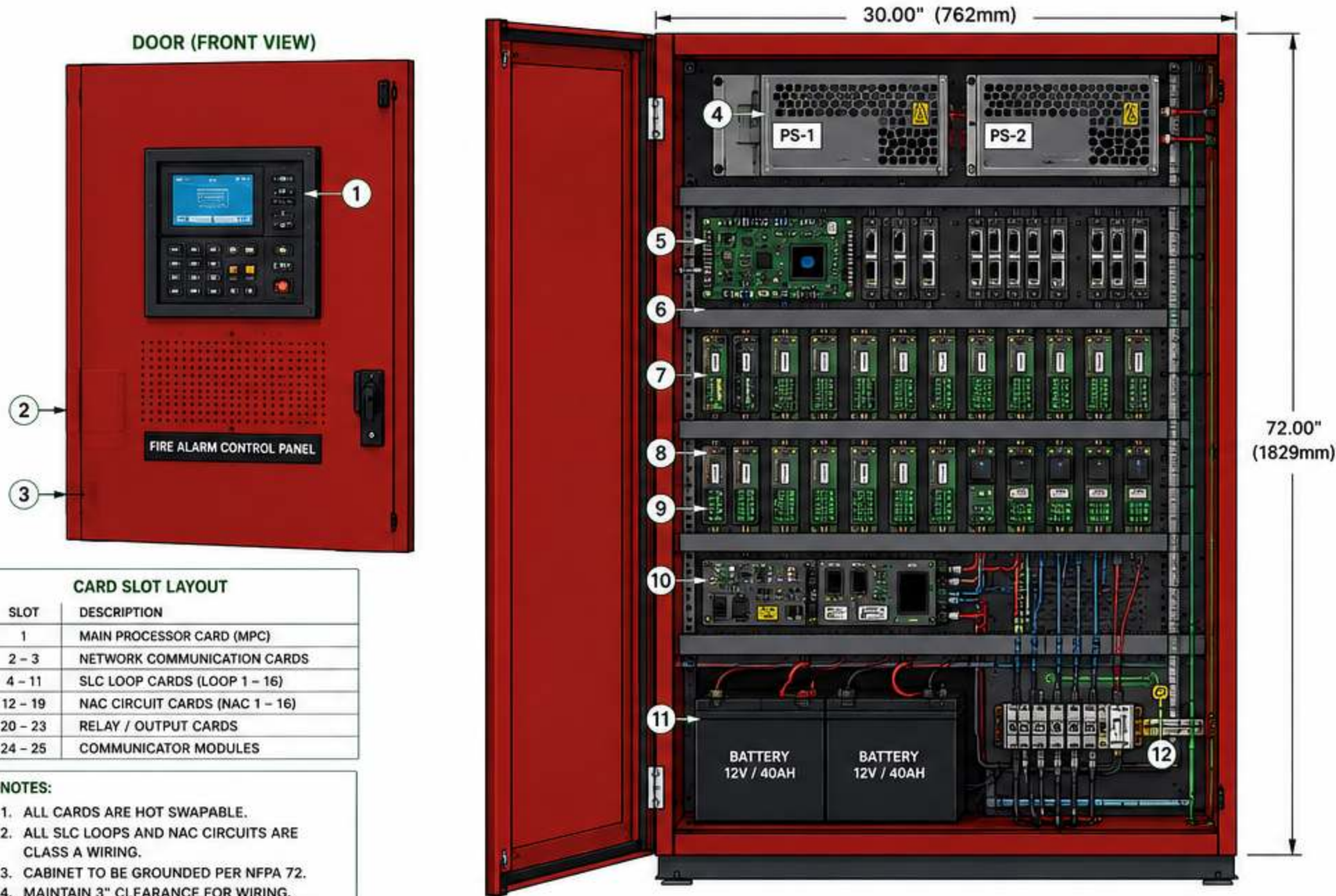
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FACP CABINET LAYOUT – MAIN FACP #1 (PRIMARY)

FIRE ALARM CONTROL PANEL CABINET – INTERIOR LAYOUT
NEMA 1 ENCLOSURE – RED FINISH

DRAWING NUMBER
FA-DRW-004

REV: 0 DATE: 05/15/2024



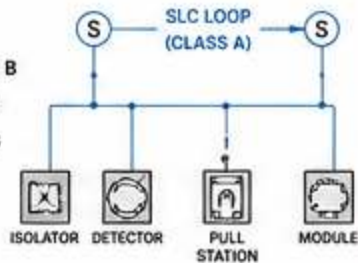
COMPONENT LEGEND			
ITEM	DESCRIPTION	QTY	NOTES
1	OPERATOR INTERFACE UNIT (OIU)	1	FULL GRAPHIC DISPLAY
2	DOOR LOCK / LATCH	1	KEY LOCK
3	DOOR MOUNTED DOCUMENT POCKET	1	HOLDS MANUALS
4	POWER SUPPLY UNITS (PS-1, PS-2)	2	24VDC @ 10A EACH
5	MAIN PROCESSOR CARD (MPC)	1	CPU / SYSTEM CONTROL
6	NETWORK COMMUNICATION CARDS	2	FIBER / ETHERNET
7	SLC LOOP CARDS	8	CLASS A, 2 LOOPS EACH
8	NAC CIRCUIT CARDS	8	2 CIRCUITS EACH
9	RELAY / OUTPUT CARDS	4	FORM-C RELAYS
10	COMMUNICATOR MODULES (MOX/IP)	2	IP & CELLULAR
11	BATTERIES	2	12V / 40AH EACH
12	TERMINAL BLOCKS	1	FIELD WIRING TERMINATION

CABINET SPECIFICATIONS	
ENCLOSURE TYPE:	NEMA 1
CABINET SIZE (H x W x D):	72.00" x 30.00" x 10.00"
MATERIAL:	14 GAUGE STEEL
FINISH:	RED POWDER COAT
MOUNTING:	FLOOR MOUNTED
WEIGHT (APPROX.):	210 LBS (EMPTY)
CABLE ENTRY:	TOP & BOTTOM

POWER REQUIREMENTS	
PRIMARY POWER:	120VAC, 60Hz, 5A
SECONDARY POWER:	24VDC
BATTERY CAPACITY:	24VDC, 40AH (MIN. EACH)
STANDBY:	24 HOURS
ALARM:	5 MINUTES (FULL LOAD)

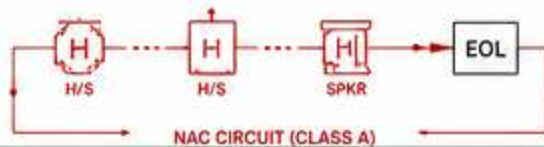
SLC LOOP CAPACITY (PER LOOP)

- DEVICES PER LOOP: 127 MAX
- ISOLATORS PER LOOP: 99 MAX
- WIRING STYLE: CLASS A OR B
- WIRE TYPE: FPLR / FPLP
- WIRE SIZE: 18 - 12 AWG



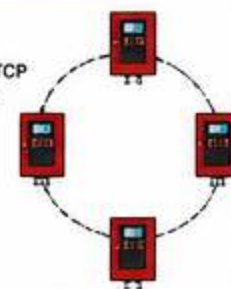
NAC CIRCUIT CAPACITY (PER CIRCUIT)

- CIRCUIT CLASS: CLASS A
- VOLTAGE: 24VDC
- CURRENT: 3A MAX
- EOL RESISTOR: 4.7K OHM



NETWORK COMMUNICATIONS

- PRIMARY: FIBER (MM) 100/1000 Mbps
- SECONDARY: ETHERNET (TCP/IP)
- PROTOCOL: NFN / BACnet / Modbus TCP
- TOPOLOGY: REDUNDANT FIBER RING



SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
FACP CABINET LAYOUT
MAIN FACP #1 (PRIMARY)

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

FLOOR ZONE MAP – TYPICAL FLOOR (LEVEL 15)

FIRE ALARM SYSTEM DETECTION ZONES & DEVICE LOCATIONS

DRAWING NUMBER
FA-DRW-005

REV: 0 DATE: 05/15/2024

LEGEND

- (S) PHOTOELECTRIC SMOKE DETECTOR
- (H) HEAT DETECTOR
- (DS) DUCT SMOKE DETECTOR
- (M) MANUAL PULL STATION
- (MM) MONITOR MODULE
- (CM) CONTROL MODULE
- (H) HORN / STROBE
- (SP) SPEAKER / STROBE
- (I/O) ADDRESSABLE I/O MODULE
- ZONE BOUNDARY
- 15-01 ZONE NUMBER
- ELEVATOR
- STAIRWELL

GENERAL NOTES

- ALL DEVICES ARE ADDRESSABLE AND SHOWN FOR DESIGN INTENT ONLY.
- ZONE BOUNDARIES ARE TYPICAL FOR LEVELS 8-45 (OFFICE/RESIDENTIAL).
- REFER TO FA-DRW-006 FOR DETECTOR COVERAGE PLAN.
- ALL SPACING AND PLACEMENT PER NFPA 72 (2019), 17.7 & 17.7.5.
- DEVICES MOUNTED PER ARCHITECTURAL REFLECTED CEILING PLAN.

ZONE SUMMARY (LEVEL 15)

ZONE NO.	ZONE NAME	AREA (SQ FT)	OCCUPANCY
15-01	NORTHWEST OFFICE	2,480	BUSINESS
15-02	NORTH OPEN OFFICE	3,960	BUSINESS
15-03	NORTHEAST OFFICE	2,480	BUSINESS
15-04	EAST OFFICE	2,600	BUSINESS
15-05	SOUTHEAST OFFICE	2,480	BUSINESS
15-06	SOUTH OPEN OFFICE	3,960	BUSINESS
15-07	SOUTHWEST OFFICE	2,480	BUSINESS
15-08	WEST OFFICE	2,600	BUSINESS

ZONE NOTES

- EACH ZONE IS ASSIGNED TO A DEDICATED NAC CIRCUIT FOR NOTIFICATION APPLIANCES.
- VOICE EVACUATION ZONES ALIGN WITH FIRE ALARM ZONES (SEE FA-DRW-018).
- ALL DEVICES ARE SUPERVISED AND POWER LIMITED.

SYMBOL COUNT (LEVEL 15)

SYMBOL	DESCRIPTION	QTY (EST.)
(S)	SMOKE DETECTOR	64
(H)	HEAT DETECTOR	4
(DS)	DUCT SMOKE DETECTOR	2
(M)	MANUAL PULL STATION	12
(MM)	MONITOR MODULE	8
(CM)	CONTROL MODULE	2
(I/O)	I/O MODULE	1
(SP)	SPEAKER/STROBE	16



SOUTH

ABBREVIATIONS

FACP	Fire Alarm Control Panel
SLC	Signaling Line Circuit
NAC	Notification Appliance Circuit
MM	Monitor Module
CM	Control Module
I/O	Input / Output Module

ZONE COLOR LEGEND

15-01	NORTHWEST OFFICE	15-05	SOUTHEAST OFFICE
15-02	NORTH OPEN OFFICE	15-06	SOUTH OPEN OFFICE
15-03	NORTHEAST OFFICE	15-07	SOUTHWEST OFFICE
15-04	EAST OFFICE	15-08	WEST OFFICE

THIS DRAWING IS TYPICAL FOR
FLOORS 8-45 (EXCLUDING MECHANICAL
PENTHOUSE & SPECIAL USE FLOORS).

SKYLINE TOWER COMPLEX FIRE ALARM & LIFE SAFETY SYSTEM FLOOR ZONE MAP – TYPICAL FLOOR LEVEL 15

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	1/8" = 1'-0"
SHEET:	1 OF 1

DETECTOR PLACEMENT PLAN – TYPICAL OFFICE FLOOR (LEVEL 15)

FIRE ALARM SYSTEM

DETECTOR COVERAGE PER NFPA 72 SPACING REQUIREMENTS

LEGEND

S

PHOTOELECTRIC SMOKE DETECTOR

H

HEAT DETECTOR (FIXED TEMP.)

R

RATE-OF-RISE HEAT DETECTOR

DS

BEAM SMOKE DETECTOR

DS

DUCT SMOKE DETECTOR

M

MANUAL PULL STATION

MM

MONITOR MODULE

CM

CONTROL MODULE

SP

SPEAKER / STROBE

ICM

ADDRESSABLE I/O MODULE

ZONE BOUNDARY

- DETECTOR COVERAGE NOTES
1.

SMOKE DETECTOR COVERAGE RADIUS SHALL NOT EXCEED 30'-0" PER NFPA 72.
2.

HEAT DETECTOR COVERAGE RADIUS SHALL NOT EXCEED 50'-0" PER NFPA 72.
3.

MAINTAIN 3'-0" CLEARANCE FROM AIR SUPPLY DIFFUSERS AND RETURN AIR GRILLES.
4.

MAINTAIN 3'-0" CLEARANCE FROM CEILING-MOUNTED LIGHT FIXTURES.
5.

MAINTAIN 1'-0" MINIMUM CLEARANCE FROM WALLS AND OBSTRUCTIONS.
6.

BEAM DETECTORS SPAN MAX 50'-0" BETWEEN WALLS PER NFPA 72.

SYMBOL IDENTIFIERS

15-02

ZONE NUMBER

S

DETECTOR TYPE
S = SMOKE
H = HEAT

S15-02-17

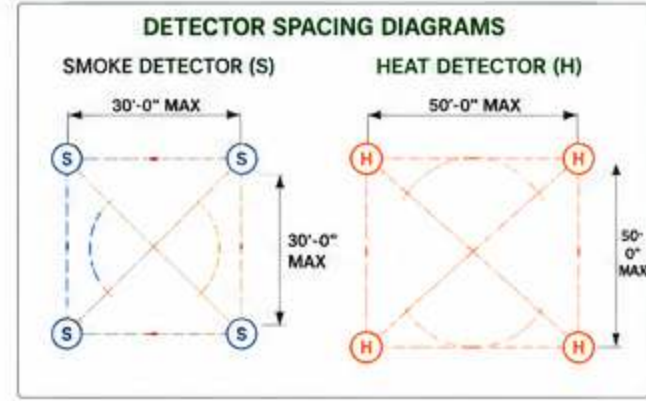
DEVICE ADDRESS (EXAMPLE)



DETECTOR SCHEDULE (LEVEL 15)

TYPE	QTY	COVERAGE RADIUS	SPACING (MAX)	NOTES
PHOTOELECTRIC SMOKE (S)	29	30'-0"	30'-0"	OFFICE AREAS
HEAT (FIXED TEMP.) (H)	2	50'-0"	50'-0"	SERVER / ELEC.
DUCT SMOKE DETECTOR (DS)	2	--	--	HVAC SUPPLY
BEAM SMOKE DETECTOR (BD)	0	--	--	NOT USED
RATE-OF-RISE HEAT (R)	0	--	--	NOT USED

- GENERAL NOTES
- DETECTOR SPACING AND COVERAGE PER NFPA 72 (2019), 17.7, 17.7.5, 17.7.6.
- ALL DEVICES ARE ADDRESSABLE AND SUPERVISED.
- REFER TO FA-DRW-016 FOR SLC LOOP ASSIGNMENTS AND DEVICE ADDRESSES.
- COORDINATE ALL DEVICE LOCATIONS WITH ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS.
- VERIFY CEILING HEIGHT AND OBSTRUCTIONS PRIOR TO INSTALLATION.

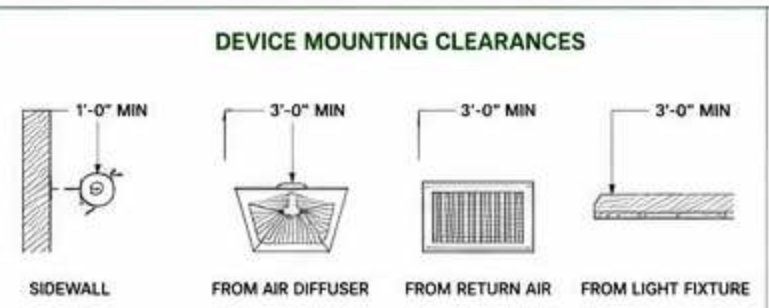


CEILING MOUNTING HEIGHT

MIN: 8'-0" AFF

MAX: 30'-0" AFF

REFER TO NFPA 72 TABLE 17.7.6.2



ZONE COLOR LEGEND (LEVEL 15)

15-02	NORTHWEST OFFICE ZONE	15-05	SOUTHEAST OFFICE ZONE
15-02	NORTH OPEN OFFICE ZONE	15-06	SOUTH OPEN OFFICE ZONE
15-03	NORTHEAST OFFICE ZONE	15-07	SOUTHWEST OFFICE ZONE
15-04	EAST OFFICE ZONE	15-08	WEST OFFICE ZONE

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

DETECTOR PLACEMENT PLAN

TYPICAL OFFICE FLOOR (LEVEL 15)

DETECTION COVERAGE PER NFPA 72

DRAWN BY:	AEG
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APPROVED BY:	AEG
SCALE:	1/8" = 1'-0"
SHEET:	1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

NAC CIRCUIT DIAGRAM

NOTIFICATION APPLIANCE CIRCUIT (NAC)

CLASS A WIRING – HORN/STROBE CIRCUIT WITH END-OF-LINE RESISTOR SUPERVISION

DRAWING NUMBER

FA-DRW-007

REV: 0

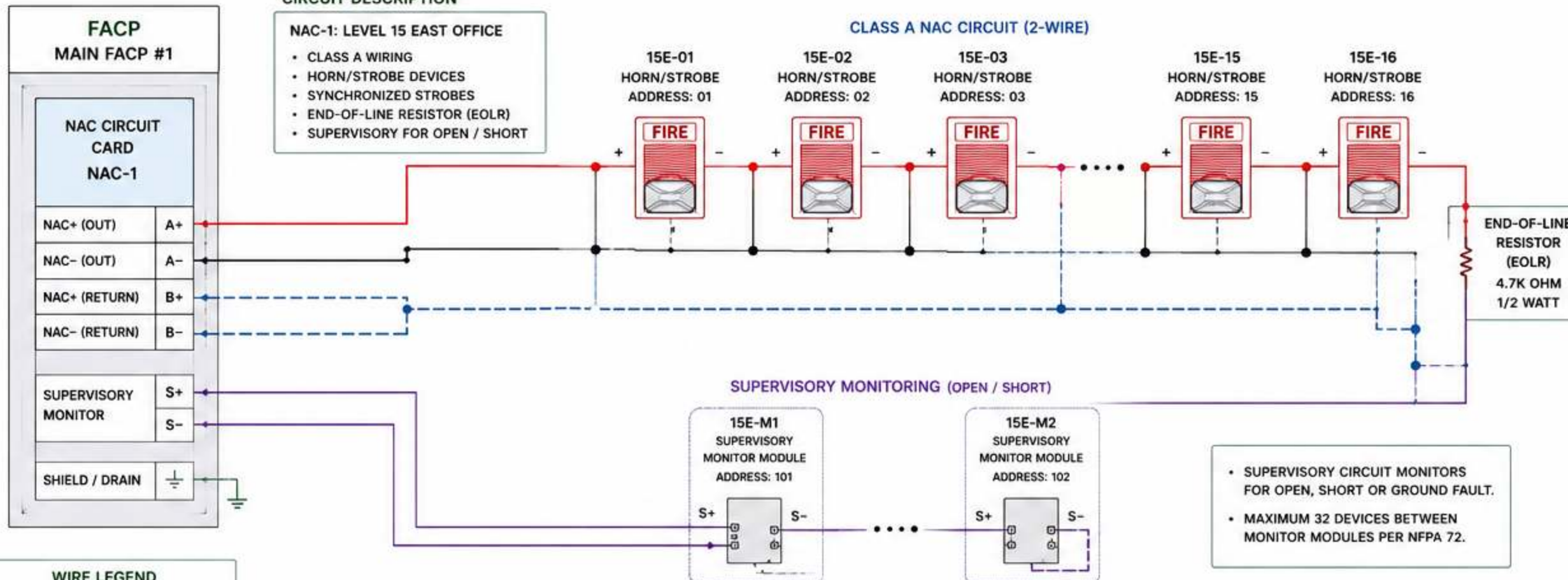
DATE: 05/15/2024

CIRCUIT DESCRIPTION

NAC-1: LEVEL 15 EAST OFFICE

- CLASS A WIRING
- HORN/STROBE DEVICES
- SYNCHRONIZED STROBES
- END-OF-LINE RESISTOR (EOLR)
- SUPERVISORY FOR OPEN / SHORT

CLASS A NAC CIRCUIT (2-WIRE)



NAC CIRCUIT SUMMARY

CIRCUIT ID:	NAC-1
FLOOR / AREA:	LEVEL 15 EAST OFFICE
APPLIANCE TYPE:	HORN/STROBE
WIRING CLASS:	CLASS A
VOLTAGE:	24 VDC
MAX CURRENT:	3.0 A
ACTUAL CURRENT:	2.61 A
WIRE SIZE:	14 AWG
EOL RESISTOR:	4.7K OHM, 1/2W
TOTAL DEVICES:	16
SUPERVISORY:	MONITORED

NOTES

- ALL DEVICES SHALL BE UL LISTED FOR FIRE PROTECTIVE SIGNALING.
- MOUNT APPLIANCES PER NFPA 72 18" AFF (TYP).
- MAINTAIN MIN 12" SEPARATION BETWEEN HORN/STROBES.
- DEVICE ADDRESSES SHOWN ARE EXAMPLES. REFER TO POINT LIST FOR ACTUAL ADDRESSES.

- SUPERVISORY CIRCUIT MONITORS FOR OPEN, SHORT OR GROUND FAULT.
- MAXIMUM 32 DEVICES BETWEEN MONITOR MODULES PER NFPA 72.

WIRE LEGEND

- NAC+ (OUT)
- NAC- (OUT)
- NAC+ (RETURN)
- NAC- (RETURN)
- SUPERVISORY S+
- SUPERVISORY S-
- SHIELD / DRAIN (OPTIONAL)

GENERAL NOTES

- ALL NAC WIRING SHALL BE IN ACCORDANCE WITH NFPA 72, 17.7.3.
- MAXIMUM VOLTAGE DROP SHALL NOT EXCEED 3.0 VDC (10% OF NOMINAL VOLTAGE).
- USE TWISTED PAIR CABLE FOR NAC CIRCUITS.
- DEVICES ARE SYNCHRONIZED STROBES.
- EOL RESISTOR: 4.7K OHM, 1/2 WATT, 5% TOL.

NAC CIRCUIT CALCULATIONS

NAC CIRCUIT:	NAC-1 (LEVEL 15 EAST OFFICE)
APPLIANCE TYPE:	HORN/STROBE, 24VDC, 15/75cd
QUANTITY:	16 DEVICES
CURRENT PER DEVICE:	0.163 A (TYP)
TOTAL CURRENT:	2.61 A
MAX CIRCUIT CURRENT:	3.0 A
VOLTAGE DROP:	2.45 VDC (8.1%) ✓ PASS
WIRE SIZE:	14 AWG (CLASS A)

CIRCUIT WIRING NOTES

- CLASS A CONFIGURATION PROVIDES SUPERVISION OF BOTH SIDES OF THE CIRCUIT.
- IF A WIRE IS OPEN, CIRCUIT REMAINS SUPERVISED.
- IF A WIRE IS SHORTED, CIRCUIT REMAINS SUPERVISED.
- EOLR INSTALLED AT THE END OF THE CIRCUIT.
- SUPERVISORY MODULES MONITOR CONTINUITY.

DEVICE LEGEND

SYMBOL	DESCRIPTION
	HORN/STROBE (SYNCHRONIZED)
	SUPERVISORY MONITOR MODULE
	EOL RESISTOR 4.7K OHM, 1/2W

ABBREVIATIONS

FACP	Fire Alarm Control Panel
NAC	Notification Appliance Circuit
EOLR	End-of-Line Resistor
SLC	Signaling Line Circuit
UL	Underwriters Laboratories
VDC	Volts DC

WIRE REQUIREMENTS (MINIMUM)

NAC CIRCUITS:	14 AWG TWISTED PAIR
SUPERVISORY:	18 AWG TWISTED PAIR
SHIELD:	18 AWG DRAIN WIRE (OPTIONAL)
CONDUIT:	AS REQUIRED BY CODE
RATING:	FPL / FPLR / FIRE RATED

REFERENCE STANDARDS

NFPA 72 – NATIONAL FIRE ALARM CODE 2022 EDITION
NFPA 70 – NATIONAL ELECTRICAL CODE 2023 EDITION

SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
NAC CIRCUIT DIAGRAM
CLASS A WIRING – HORN/STROBE
NAC-1 (LEVEL 15 EAST OFFICE)

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

VOICE EVACUATION SYSTEM

HIGH-RISE VOICE EVACUATION ARCHITECTURE

NFPA 72 COMPLIANT – EMERGENCY COMMUNICATIONS SYSTEM (ECS) INTEGRATION

DRAWING NUMBER

FA-DRW-008

REV: 0

DATE: 05/15/2024

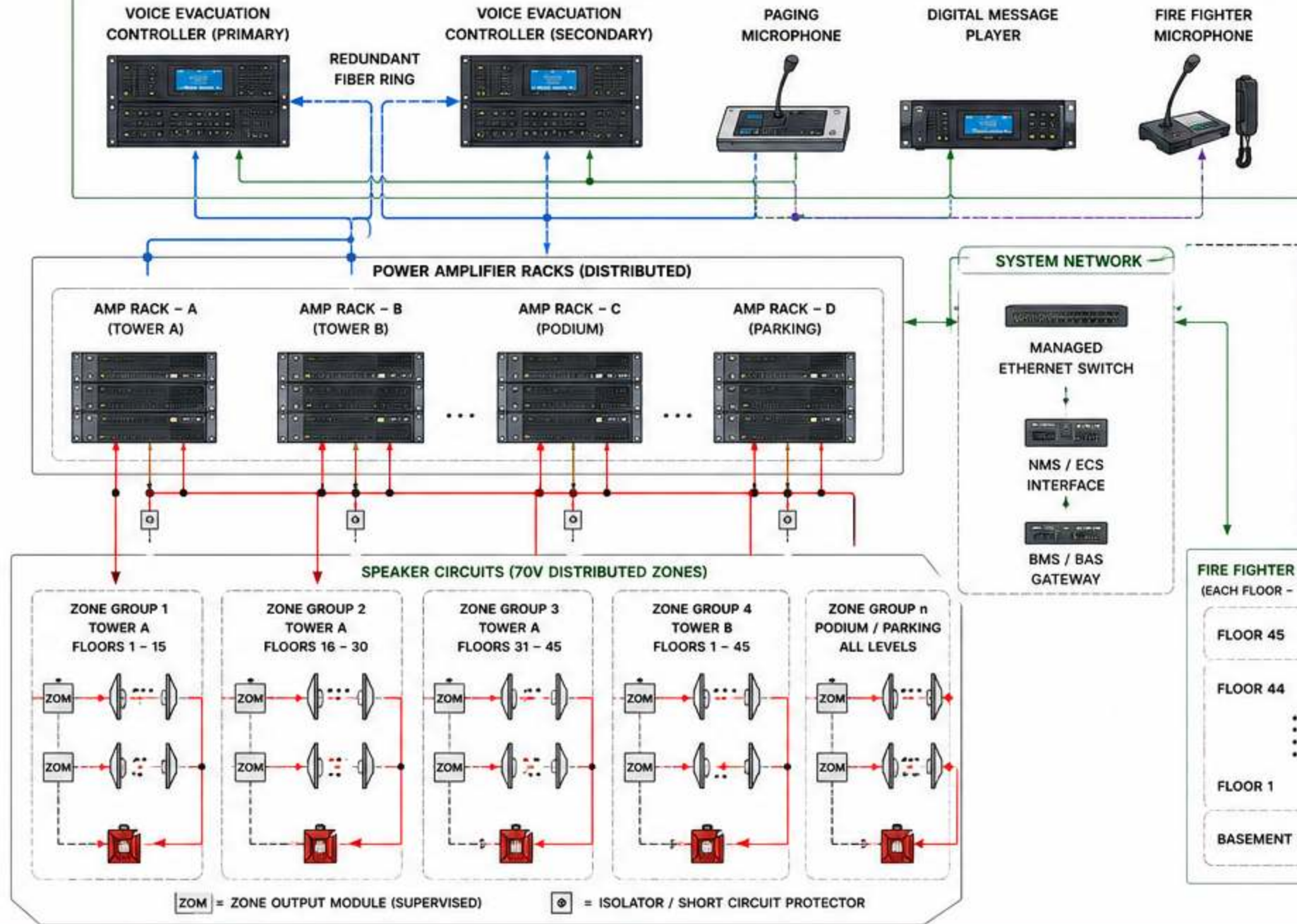
LEGEND

- AUDIO (70V SPEAKER)
- FIBER OPTIC
- ETHERNET (TCP/IP)
- CONTACT / CONTROL
- AUDIO (MIC/LINE LEVEL)
- RS-485 / RS-232
- GPI / GPO
- VOICE EVACUATION CONTROLLER
- POWER AMPLIFIER
- FIRE FIGHTER MICROPHONE
- FIRE FIGHTER TELEPHONE HANDSET
- SPEAKER / CEILING SPEAKER
- HORN / STROBE
- ZONE OUTPUT MODULE
- ISOLATOR / SHORT CIRCUIT PROTECTOR

GENERAL NOTES

- VOICE INTELLIGIBILITY SHALL COMPLY WITH NFPA 72 (18.4.5) – STI ≥ 0.50 .
- ALL SPEAKER CIRCUITS ARE POWER LIMITED AND SUPERVISED.
- CIRCUITS SHOWN ARE TYPICAL. REFER TO PLANS FOR QUANTITIES.
- FIRE FIGHTER MICROPHONES ARE LOCATED IN FIRE COMMAND CENTER AND AT EACH FLOOR FIRE COMMAND STATION.

FIRE COMMAND CENTER (LEVEL 2)



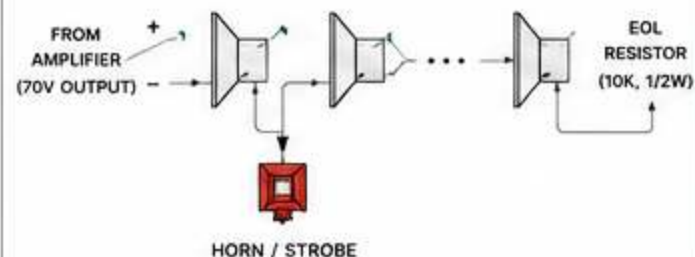
ECS INTEGRATION

- FACP (ALARM SIGNALS)
- FIRE COMMAND CENTER (GENERAL ALARM / PAGE)
- BMS / BAS (HVAC SHUTDOWN, DAMPERS)
- ELEVATOR SYSTEM (RECALL / PHASE I & II)
- ACCESS CONTROL (DOOR RELEASES)
- MASS NOTIFICATION SYSTEM (PUBLIC ADDRESS)
- PHONE SYSTEM / SIP (PHONE PATCH)

SYSTEM SPECIFICATIONS

AMPLIFIER OUTPUT VOLTAGE:	70 VRMS
AMPLIFIER POWER:	500W / 1000W TYP.
THD:	< 5%
FREQUENCY RESPONSE:	80 Hz – 16 kHz
AUDIO FORMAT:	PCM DIGITAL
NETWORK PROTOCOL:	DANTE / AES67
POWER SOURCE:	120VAC, 60Hz
BATTERY BACKUP:	24 HOURS STANDBY + 5 MIN ALARM
SPEAKERS:	FIRE RATED CEILING / WALL
WIRING:	CLASS A (POWER LIMITED)
CODE COMPLIANCE:	NFPA 72, IBC, IFC

TYPICAL SPEAKER CIRCUIT (70V)



FIRE FIGHTER MICROPHONE STATION (TYP.)



FIRE FIGHTER TELEPHONE STATION (TYP.)



SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
VOICE EVACUATION SYSTEM
HIGH-RISE VOICE EVACUATION ARCHITECTURE
ECS INTEGRATION

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

SUPPRESSION SYSTEM INTERFACE DIAGRAM

FIRE ALARM SYSTEM TO SUPPRESSION SYSTEMS
SPRINKLER, STANDPIPE, CLEAN AGENT, KITCHEN, FOAM SYSTEMS

DRAWING NUMBER

FA-DRW-009

REV: 0

DATE: 05/15/2024

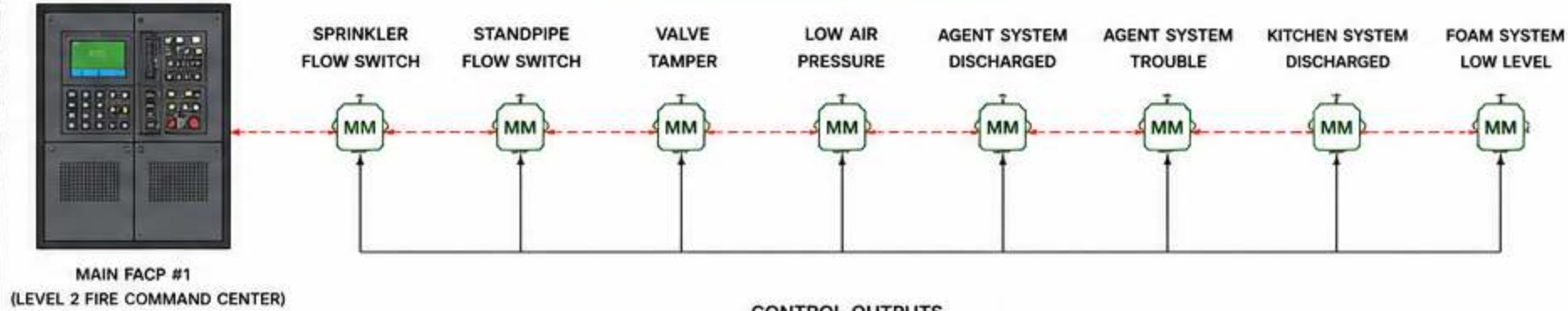
LEGEND

FS	FLOW SWITCH
TS	TAMPER SWITCH
PS	PRESSURE SWITCH
SP	SUPERVISORY PRESSURE SWITCH
V	CONTROL VALVE
SV	SOLENOID VALVE
A	ALARM BELL
R	RELAY MODULE
---	SUPERVISED CIRCUIT (CLASS B)
—	CONTROL CIRCUIT
—	POWER / 120VAC
FACP	FIRE ALARM CONTROL PANEL

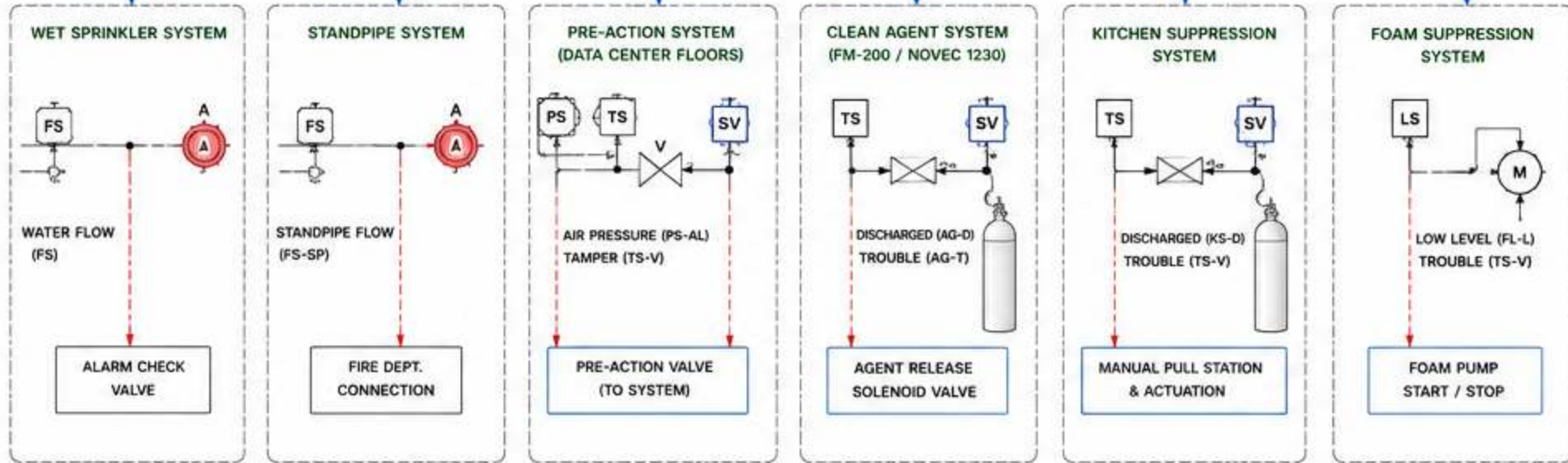
GENERAL NOTES

- ALL SUPPRESSION SYSTEMS SHALL BE MONITORED AND SUPERVISED BY THE FIRE ALARM SYSTEM PER NFPA 72.
- ALL VALVES AND DEVICES SHOWN ARE BY OTHERS. FIRE ALARM CONNECTIONS BY FIRE ALARM CONTRACTOR.
- PROVIDE ADDRESSABLE MONITOR MODULES FOR ALL INITIATING AND SUPERVISORY DEVICES.
- PROVIDE CONTROL RELAY MODULES FOR ALL SYSTEM SHUTDOWNS AND VALVE RELEASE CIRCUITS.
- REFER TO INDIVIDUAL SYSTEM DRAWINGS FOR DETAILED PIPING AND MECHANICAL INSTALLATION.

FIRE ALARM CONTROL PANEL (FACP)



CONTROL OUTPUTS



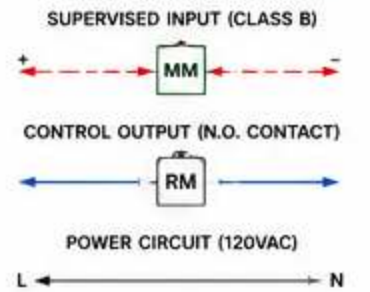
MONITORED INPUTS

TAG	DESCRIPTION
FS-xx	SPRINKLER FLOW SWITCH (BY ZONE)
FS-SP	STANDPIPE FLOW SWITCH
TS-V	VALVE TAMPER SWITCH
PS-AL	AIR PRESSURE LOW (PRE-ACTION)
PS-SP	STANDPIPE LOW PRESSURE
AG-D	CLEAN AGENT SYSTEM DISCHARGED
AG-T	CLEAN AGENT SYSTEM TROUBLE
KS-D	KITCHEN SYSTEM DISCHARGED
FL-L	FOAM SYSTEM LOW LEVEL

CONTROL OUTPUTS

TAG	DESCRIPTION
AL-SPK	SPRINKLER ALARM BELL
AL-SPP	STANDPIPE ALARM BELL
PV-REL	PRE-ACTION VALVE RELEASE
AG-REL	CLEAN AGENT RELEASE
KS-ACT	KITCHEN SYSTEM ACTUATION
FL-ACT	FOAM SYSTEM ACTIVATION
HVAC-SD	HVAC SHUTDOWN
EL-REC	ELEVATOR RECALL

CIRCUIT LEGEND (TYP.)



ABBREVIATIONS

FACP	Fire Alarm Control Panel	PS	Pressure Switch
MM	Monitor Module (Addressable)	SV	Solenoid Valve
RM	Relay Module (Addressable)	HVAC	Heating, Ventilation & Air Conditioning
FS	Flow Switch	AG	Clean Agent
TS	Tamper Switch		

APPLICABLE STANDARDS

- NFPA 72 – NATIONAL FIRE ALARM CODE (2022)
- NFPA 13 – STANDARD FOR INSTALLATION OF SPRINKLER SYSTEMS
- NFPA 2001 – CLEAN AGENT FIRE EXTINGUISHING SYSTEMS
- NFPA 17 – DRY CHEMICAL, FOAM-WATER & WET CHEMICAL SYSTEMS
- NFPA 101 – LIFE SAFETY CODE

NOTES

- ALL INTERFACES ARE SUPERVISED.
- CONTACT RATINGS PER MANUFACTURER REQUIREMENTS.
- ALL RELAYS ARE DE-ENERGIZED TO ACTIVATE (FAIL-SAFE).
- COORDINATE ALL SHUTDOWNS WITH BMS.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

SUPPRESSION SYSTEM INTERFACE DIAGRAM

FIRE ALARM SYSTEM TO SUPPRESSION SYSTEMS

DRAWN BY: AEG

CHECKED BY: AEG

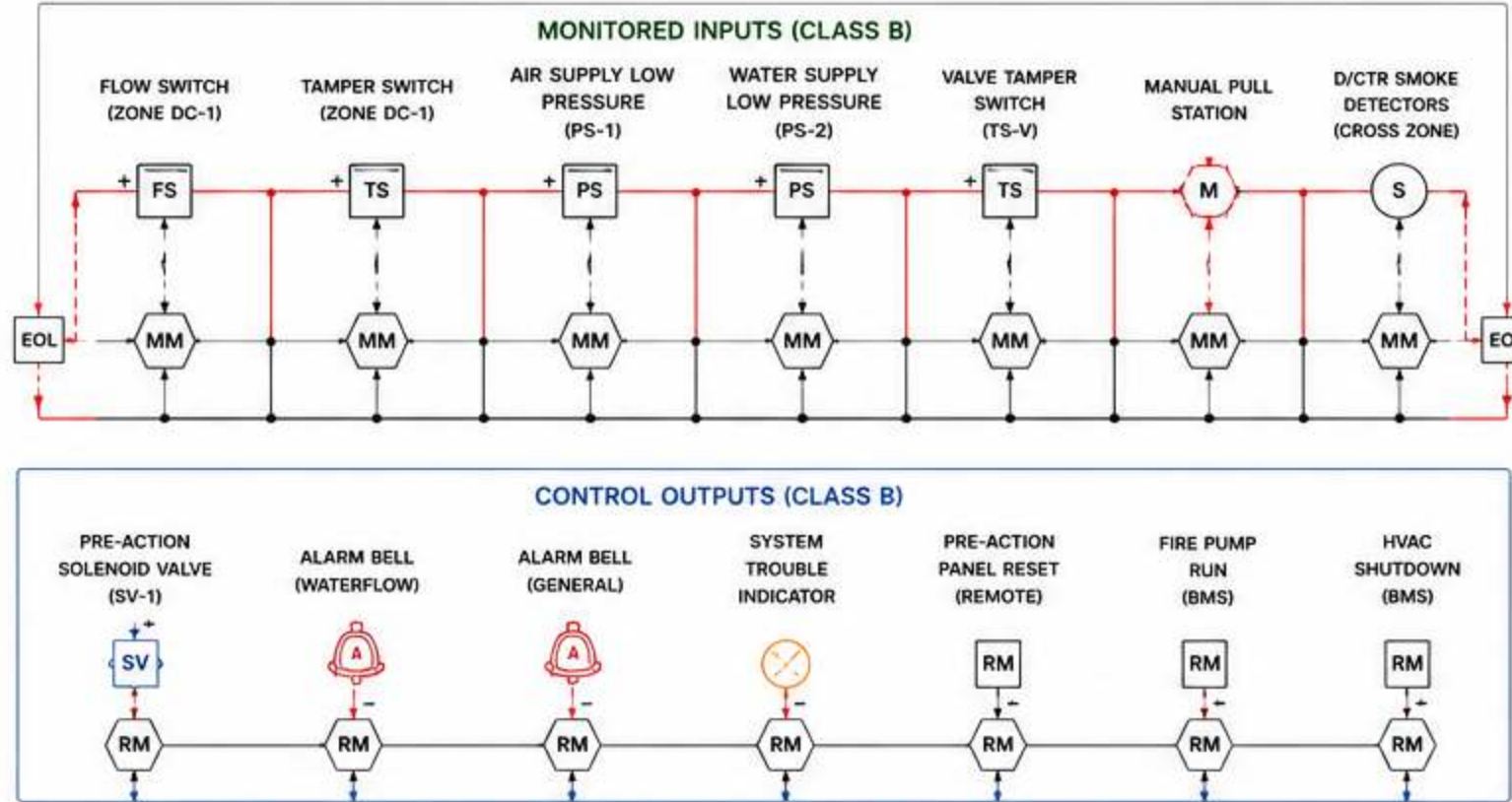
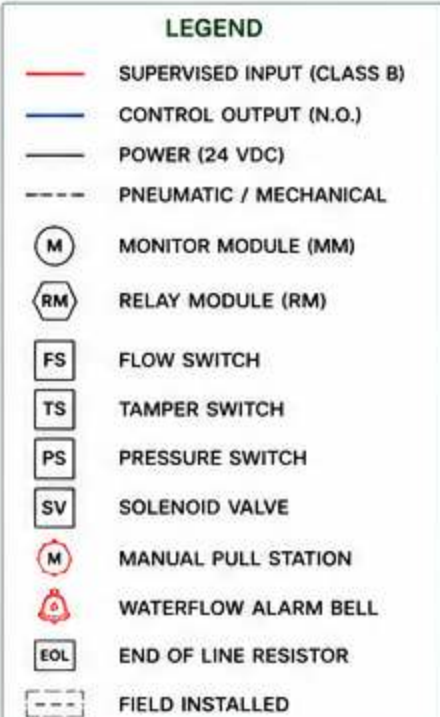
APPROVED BY: AEG

SCALE: N.T.S.

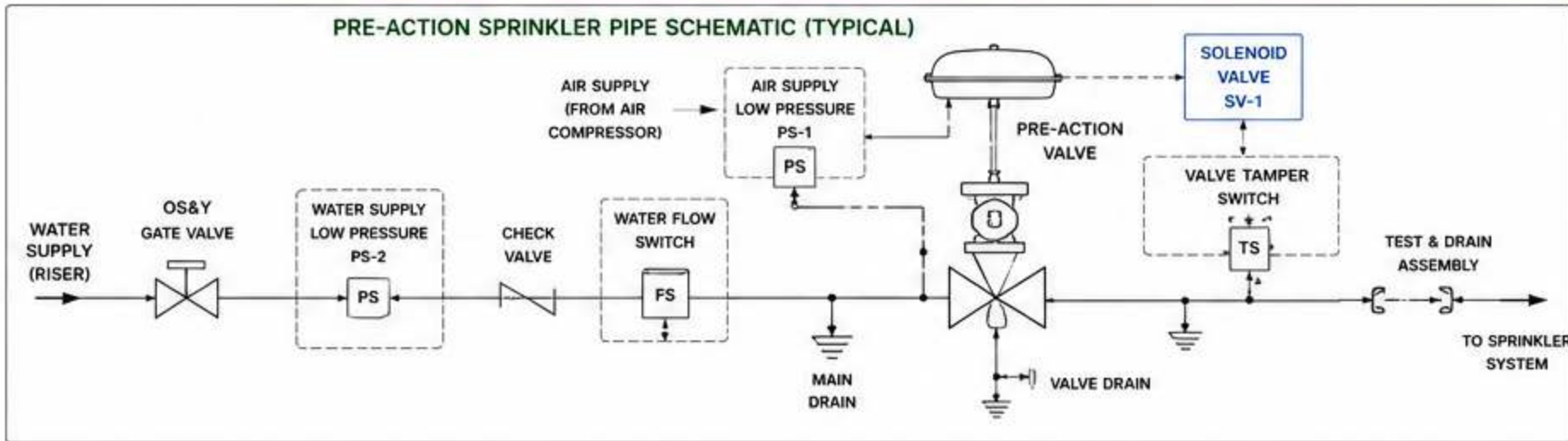
SHEET: 1 OF 1

PRE-ACTION SPRINKLER INTERFACE

DATA CENTER FLOORS (LEVELS 12, 13, 14 & 30)
FIRE ALARM SYSTEM INTERFACE - DOUBLE INTERLOCK PRE-ACTION SYSTEM



- GENERAL NOTES**
- PRE-ACTION SYSTEM IS DOUBLE INTERLOCK:
 - CROSS ZONING (ELECTRIC DETECTION)
 - WATERFLOW (MECHANICAL DETECTION)
 - ALL INPUTS ARE SUPERVISED PER NFPA 72.
 - TAMPER SWITCHES SUPERVISED IN NORMAL POSITION.
 - WATER SUPPLY PRESSURE MONITORED FOR LOW PRESSURE SUPERVISORY.
 - SOLENOID VALVE DE-ENERGIZED CLOSED. ENERGIZED TO OPEN.
 - REFER TO DETAIL SHEET FOR PIPING & MECHANICAL INSTALLATION REQUIREMENTS.



INPUT / OUTPUT SUMMARY	
MONITORED INPUTS	
POINT ID	DESCRIPTION
FS-DC-1	FLOW SWITCH (ZONE DC-1)
TS-DC-1	TAMPER SWITCH (ZONE DC-1)
PS-AIR-1	AIR SUPPLY LOW PRESSURE (DATA CENTER)
PS-WAT-1	WATER SUPPLY LOW PRESSURE
TS-V-1	VALVE TAMPER SWITCH
MPS-DC-1	MANUAL PULL STATION
SD-DC-X	SMOKE DETECTOR (CROSS ZONING)
CONTROL OUTPUTS	
POINT ID	DESCRIPTION
SV-DC-1	PRE-ACTION SOLENOID VALVE
AB-WF-1	WATERFLOW ALARM BELL
AB-GEN-1	GENERAL ALARM BELL
TI-DC-1	TROUBLE INDICATOR
R-RESET-1	REMOTE RESET
R-PMP-1	FIRE PUMP RUN (BMS)
R-HVAC-1	HVAC SHUTDOWN (BMS)

DOUBLE INTERLOCK LOGIC	
CONDITION 1 ELECTRIC DETECTION (CROSS ZONING)	CONDITION 2 WATERFLOW DETECTED

ABBREVIATIONS			
FACP	Fire Alarm Control Panel	BMS	Building Management System
MM	Monitor Module	OS&Y	Outside Screw & Yoke
RM	Relay Module	DC	Data Center
FS	Flow Switch		
TS	Tamper Switch		
PS	Pressure Switch		
SV	Solenoid Valve		

- APPLICABLE STANDARDS**
- NFPA 72 – NATIONAL FIRE ALARM CODE (2022)
 - NFPA 13 – STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS (2022)
 - NFPA 13R – STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS IN RESIDENTIAL OCCUPANCIES (2022)
 - NFPA 2001 – STANDARD ON CLEAN AGENT FIRE EXTINGUISHING SYSTEMS (2021)

- NOTES**
- ALL DEVICES AND MODULES SHALL BE UL LISTED.
 - AIR SUPPLY SHALL BE SUPERVISED FOR LOW PRESSURE.
 - WATER SUPPLY PRESSURE SHALL BE MONITORED.
 - PRE-ACTION VALVE HELD CLOSED BY AIR PRESSURE.
 - SOLENOID VALVE ENERGIZES TO RELEASE AIR AND OPEN VALVE.
 - REFER TO PROJECT SPECIFICATIONS FOR COMPLETE REQUIREMENTS.

SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
PRE-ACTION SPRINKLER INTERFACE
DATA CENTER FLOORS
(LEVELS 12, 13, 14 & 30)
DOUBLE INTERLOCK SYSTEM

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1



FIRE ALARM CAUSE & EFFECT MATRIX

FIRE ALARM & LIFE SAFETY SYSTEM

NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

LEGEND

- = AUTOMATIC ACTION
- = OPERATOR ACTION
- = SUPERVISORY SIGNAL
- = NO ACTION

NOTES

1. ALL CAUSE & EFFECTS SHALL BE PROGRAMMED IN FACP.
2. ** INDICATES ACTION DEPENDS ON PANEL PROGRAMMING OPTION.
3. ALL FUNCTIONS SHALL OPERATE IN ACCORDANCE WITH NFPA 72, IBC, IFC AND PROJECT SPECIFICATIONS.
4. PRIORITY OF OPERATIONS: LIFE SAFETY > FIRE SUPPRESSION > HVAC > ELEVATORS > OTHER SYSTEMS.

SYSTEM ABBREVIATIONS

- FACP – FIRE ALARM CONTROL PANEL
- ELEV – ELEVATOR
- PFP – FIRE PUMP
- NAC – NOTIFICATION APPLIANCE CIRCUIT
- DAMP – FIRE / SMOKE DAMPER
- GAS – GAS SHUTDOWN SYSTEM
- SLC – SIGNALING LINE CIRCUIT
- ED – ELECTRIC DOOR / HOLD OPEN DEVICE
- BMS – BUILDING MANAGEMENT SYSTEM
- HVAC – HEATING, VENTILATION & AIR CONDITIONING
- AHU – AIR HANDLING UNIT

CAUSE (INITIATING EVENT)	EFFECT (SYSTEM / ACTION)																	
	ALARM & NOTIFICATION				HVAC				ELEVATORS			BUILDING SYSTEMS				SUPERVISORY / OTHER		
	ALARM SIGNAL TO FACP	AUDIBLE / VISUAL DEVICES	FIRE COMMAND CENTER ANNUNCIATION	REMOTE ANNUNCIATOR (RAP)	SHUTDOWN AHU	CLOSE DAMPERS	START SMOKE EXHAUST	STOP SUPPLY FANS	ELEVATOR RECALL	ELEVATOR GROUP TO LOBBY	ELEVATOR SMOKE MODE	DOOR RELEASE (ED)	DOOR CLOSURE (ED)	FIRE PUMP START	GAS SHUTDOWN	BMS / BAS NOTIFICATION	LOG EVENT	SUPERVISORY SIGNAL
SMOKE DETECTOR ALARM (ZONE)							*	*							*			
HEAT DETECTOR ALARM (ZONE)							*	—	—	*		—			—	—	—	—
MANUAL PULL STATION (ZONE)							*								—			
SPRINKLER WATERFLOW (ZONE)							—	*	—	—	—	—	—	—	—	—		
SPRINKLER TAMPER (ZONE)								—	—			—	—	—	—		—	—
SUPERVISORY SIGNAL (ANY)	—	—	—	—	—	—												
TROUBLE SIGNAL (ANY)	—	—	—	—	—	—												
LOSS OF AC POWER (FACP / SYSTEM)			—	—	—	—				—	—	—	—	—	—	—	—	—
EARTHQUAKE SIGNAL (IF PROVIDED)	*		*		*		*		*	*	*					—	—	—
FIRE PUMP RUNNING (CONFIRMATION)	—	—	—	—	—		—	—	—	—	—				—		—	—
LOW AIR PRESSURE (PRE-ACTION SYSTEM)			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SMOKE CONTROL ACTIVATION (BY ZONE)						*	*	*		*	—	—	—	—	—	—	—	—
FIRE ALARM SILENCED (OPERATOR ACTION)								—							—	—	—	—
SYSTEM RESET (OPERATOR ACTION)								—							—	—	—	—

* ACTION DEPENDS ON ZONE OR SYSTEM PROGRAMMING AND CONFIGURATION.

PRIORITY OF OPERATIONS	GENERAL NOTES	ZONE / AREA DEFINITIONS	REFERENCE STANDARDS	SKYLINE TOWER COMPLEX		DRAWN BY:	AEG
1. LIFE SAFETY FUNCTIONS	• ALL CAUSE & EFFECT LOGIC SHALL BE FIELD VERIFIED DURING COMMISSIONING. • EFFECTS SHALL RETURN TO NORMAL UPON SYSTEM RESET, UNLESS OTHERWISE NOTED. • COORDINATION WITH ALL TRADES IS REQUIRED PRIOR TO FINAL PROGRAMMING.	• ZONE = DETECTOR / DEVICE ZONE AS DEFINED IN FLOOR PLANS. • AREA = GROUP OF ZONES WITH COMMON CONTROL / ACTIONS. • ALL ZONE NUMBERING SHALL MATCH THE ZONE MAP DRAWINGS. • REFER TO SPECIFICATION SECTION FOR DETAILED LOGIC.	• NFPA 72 – NATIONAL FIRE ALARM CODE (2022) • IFC 510 – FIRE ALARM AND DETECTION SYSTEMS • IBC 907.6.3 – FIRE COMMAND CENTER • NFPA 92 – SMOKE CONTROL SYSTEMS • NFPA 13 / NFPA 20 – SPRINKLER / FIRE PUMP	FIRE ALARM & LIFE SAFETY SYSTEM		CHECKED BY:	AEG
2. FIRE SUPPRESSION FUNCTIONS				CAUSE & EFFECT MATRIX		APPROVED BY:	AEG
3. SMOKE CONTROL FUNCTIONS				NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT		SCALE:	N.T.S.
4. ELEVATOR FUNCTIONS						SHEET:	1 OF 1
5. OTHER AUXILIARY FUNCTIONS							



FIRE ALARM & LIFE SAFETY SYSTEM
NFPA 92 / NFPA 92A / IBC 909 COMPLIANT

FA-DRW-012

REV: 0 DATE: 05/15/2024

- = AUTOMATIC ACTION
- = OPERATOR ACTION
- ▲ = SUPERVISORY SIGNAL
- = NO ACTION

1. THIS MATRIX SHOWS SMOKE CONTROL SYSTEM ACTIONS FOR EACH INITIATING EVENT.
2. ALL SMOKE CONTROL ACTIONS SHALL BE AUTOMATIC UNLESS NOTED AS OPERATOR ACTION.
3. ALL DAMPERS SHALL RETURN TO NORMAL (OPEN) UPON SYSTEM RESET EXCEPT WHERE NOTED.
4. PRIORITY OF SYSTEMS: LIFE SAFETY > SMOKE CONTROL > COMFORT SYSTEMS.

SCD - SMOKE CONTROL DAMPER	SPF - STAIR PRESSURIZATION FAN
EAD - EXHAUST AIR DAMPER	MSD - MOTOR SMOKE DAMPER
IAD - INTAKE AIR DAMPER	CD - CONTROL DAMPER
PF - PRESSURIZATION FAN	VD - VENTILATION DAMPER
EF - EXHAUST FAN	AC - AIR CURTAIN
JF - JET FAN	BMS - BUILDING MANAGEMENT SYSTEM

- ALL SMOKE CONTROL DAMPERS SHALL BE UL 555.
- DAMPERS POWER OPEN / SPRING CLOSE UNLESS NOTED.
- SMOKE EXHAUST FANS SHALL RUN FOR MIN. 15 MIN. OR UNTIL SYSTEM RESET.
- SMOKE CONTROL SYSTEM SHALL BE MONITORED BY FACP.
- MANUAL OVERRIDE STATIONS SHALL BE PROVIDED AT FIRE COMMAND CENTER.

[illegible]

ZONE / AREA DEFINITIONS		PRIORITY OF OPERATION	OPERATION SUMMARY	REFERENCE STANDARDS	SKYLINE TOWER COMPLEX		DRAWN BY:	AEG
ZONE 1 - LEVEL 1 - 10		1. LIFE SAFETY SYSTEMS (SMOKE CONTROL)	• SMOKE CONTROL DAMPERS IN THE AFFECTED AREA CLOSE.	• NFPA 92 - STANDARD FOR SMOKE CONTROL SYSTEMS	FIRE ALARM & LIFE SAFETY SYSTEM SMOKE CONTROL CAUSE & EFFECT MATRIX NFPA 92 / NFPA 92A / IBC 909 COMPLIANT		CHECKED BY:	AEG
ZONE 2 - LEVEL 11 - 20		2. FIRE PROTECTION SYSTEMS (SUPPRESSION)	• STAIRS AND ELEVATOR LOBBIES ARE PRESSURIZED.	• NFPA 92A - STANDARD FOR SMOKE CONTROL SYSTEMS USING DIFFERENTIAL PRESSURE			APPROVED BY:	AEG
ZONE 3 - LEVEL 21 - 30		3. ELEVATORS	• SMOKE EXHAUST FANS OPERATE TO REMOVE SMOKE.	• IBC 2021 - SECTION 909			SCALE:	N.T.S.
ZONE 4 - LEVEL 31 - 40		4. HVAC SYSTEMS	• MAKEUP AIR DAMPERS OPEN TO MAINTAIN PRESSURIZATION.	• NFPA 72 - NATIONAL FIRE ALARM CODE (2022)			SHEET:	1 OF 1
ZONE 5 - LEVEL 41 - ROOF		5. OTHER BUILDING SYSTEMS	• SYSTEM RETURNS TO NORMAL UPON RESET.	• NFPA 101 - LIFE SAFETY CODE (2021)				
GARAGE - PARKING GARAGE LEVELS								



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

STAIRWELL PRESSURIZATION SYSTEM

FIRE ALARM INTERFACE & CONTROL DIAGRAM

NFPA 92A COMPLIANT – STAIR PRESSURIZATION FOR SMOKE CONTROL

DRAWING NUMBER

FA-DRW-013

REV: 0

DATE: 05/15/2024

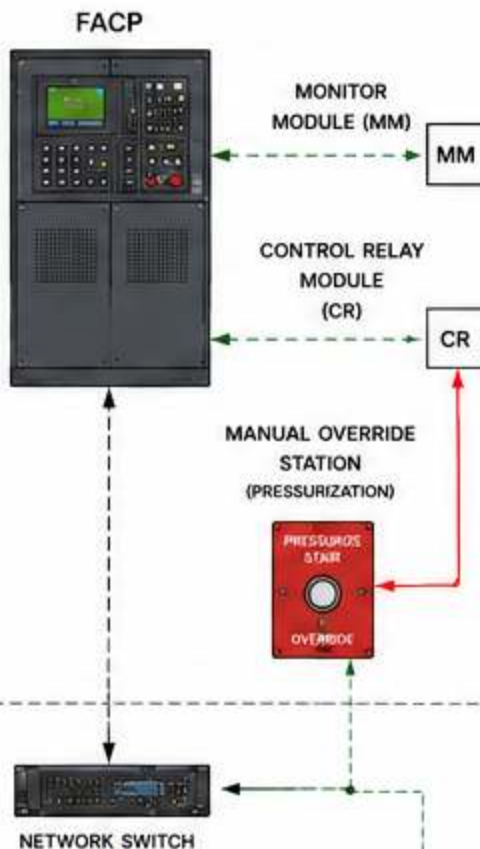
LEGEND

FACP	FIRE ALARM CONTROL PANEL
MM	MONITOR MODULE
DPS	DIFFERENTIAL PRESSURE SWITCH
TS	TEMPERATURE SWITCH
FS	FLOW SWITCH
SD	SMOKE DETECTOR
M	MOTOR
Motorized Damper	MOTORIZED DAMPER
Supply Fan	SUPPLY FAN
Pressurization Grille	PRESSURIZATION GRILLE
Relief Grille	RELIEF GRILLE
---	POWER / 120VAC
---	CONTROL / SIGNAL
---	AIR / DUCT
---	MONITORED BY FACP

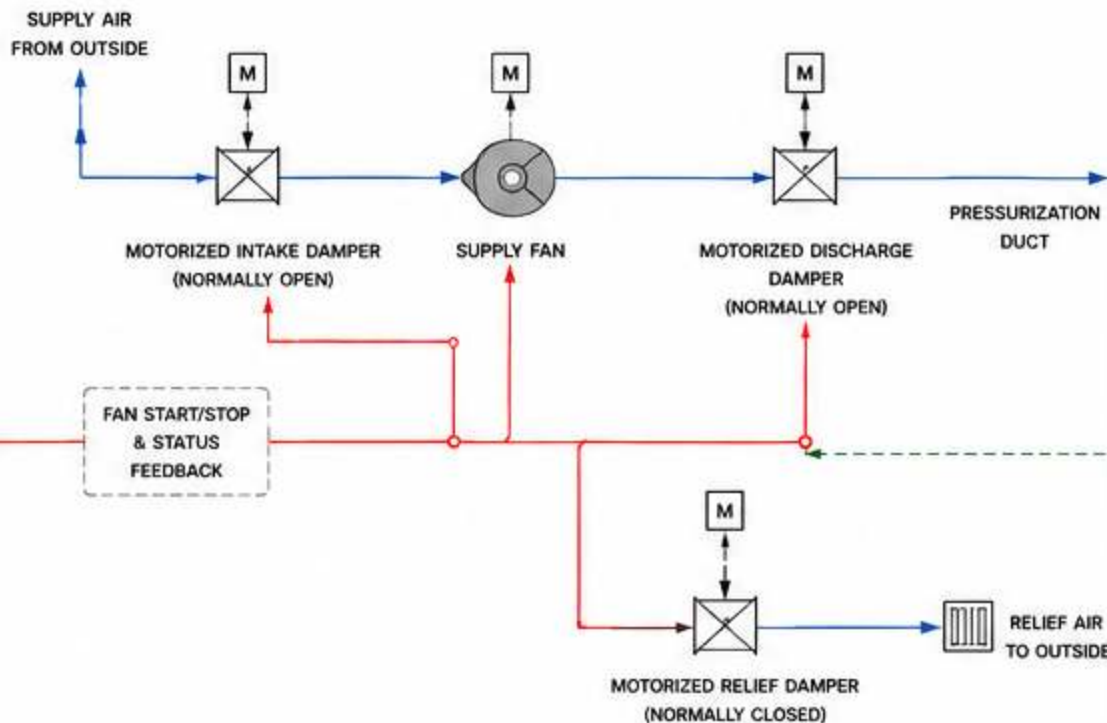
GENERAL NOTES

- SYSTEM DESIGNED PER NFPA 92A, 2018 EDITION.
- STAIRWELL PRESSURIZATION ACTUATES UPON FIRE ALARM OR MANUAL OVERRIDE.
- DIFFERENTIAL PRESSURE SHALL BE MAINTAINED AT 0.05" – 0.10" W.C.
- ALL DAMPERS AND FANS SHALL FAIL TO SAFE POSITION ON LOSS OF POWER.
- ALL DEVICES SHOWN ARE TYPICAL FOR ALL PRESSURIZED STAIRWELLS.
- REFER TO FLOOR PLANS FOR QUANTITIES AND LOCATIONS.

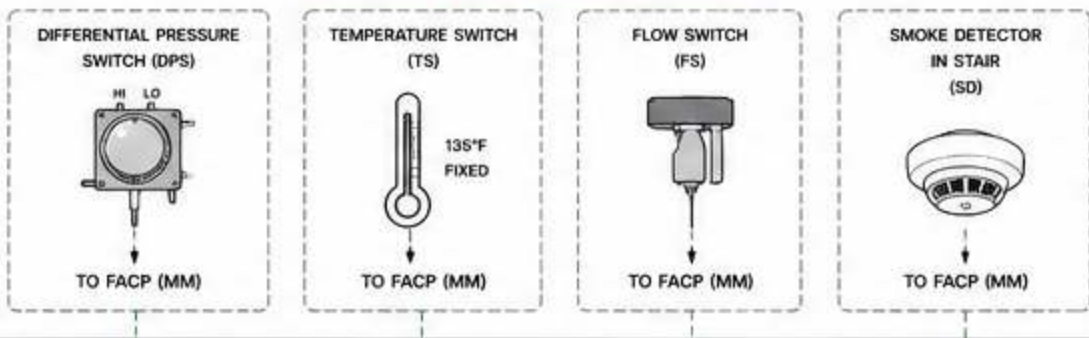
FIRE ALARM SYSTEM



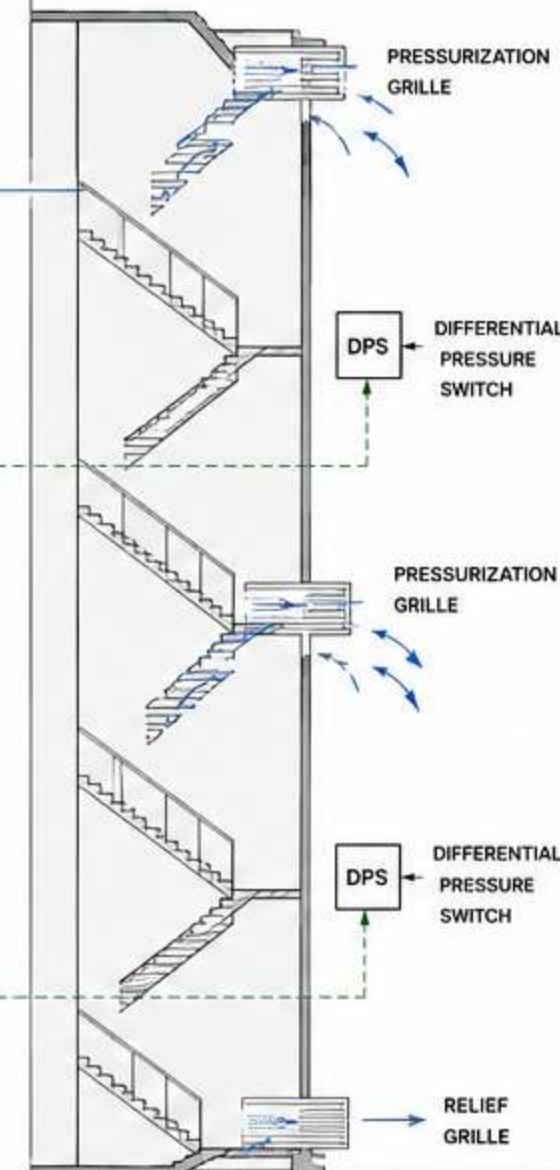
STAIR PRESSURIZATION FAN SYSTEM (TYPICAL PER STAIR)



MONITORING DEVICES (TYPICAL PER STAIR)



STAIRWELL (TYPICAL)



SEQUENCE OF OPERATION

- UPON FIRE ALARM, THE FACP ENERGIZES THE PRESSURIZATION FAN(S) AND OPENS INTAKE AND DISCHARGE DAMPERS.
- DIFFERENTIAL PRESSURE SWITCH MONITORS AND CONFIRMS POSITIVE PRESSURE IN STAIRWELL.
- IF PRESSURE FALLS BELOW SETPOINT, FAN SPEED INCREASES (IF VFD EQUIPPED) OR ALARM IS GENERATED.
- RELIEF DAMPER OPENS AS REQUIRED TO MAINTAIN DESIGN PRESSURE.
- MANUAL OVERRIDE STATION CAN ACTIVATE PRESSURIZATION AT ANY TIME.

PRESSURE CONTROL NOTES

- DESIGN PRESSURE: 0.05" – 0.10" W.C.
- PRESSURE MEASURED BETWEEN STAIRWELL AND ADJACENT FLOOR.
- ALL STAIRWELLS SHALL BE PRESSURIZED PRIOR TO FIRE SERVICE ARRIVAL.
- DAMPERS AND FANS SHALL BE LISTED FOR SMOKE CONTROL.
- FAN SHALL BE PROVIDED WITH DISCONNECT AND STATUS MONITORING.

ABBREVIATIONS

FACP	Fire Alarm Control Panel	FS	Flow Switch
MM	Monitor Module	SD	Smoke Detector
CR	Control Relay Module	VFD	Variable Frequency Drive
DPS	Differential Pressure Switch	BMS	Building Management System
TS	Temperature Switch	BAS	Building Automation System

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM
STAIRWELL PRESSURIZATION SYSTEM
FIRE ALARM INTERFACE & CONTROL DIAGRAM
NFPA 92A COMPLIANT

DRAWN BY:

AEG

CHECKED BY:

AEG

APPROVED BY:

AEG

SCALE:

N.T.S.

SHEET:

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ELEVATOR RECALL & FIREFIGHTER SERVICE

FIRE ALARM INTERFACE DIAGRAM
NFPA 72 / NFPA 101 / ASME A17.1 COMPLIANT

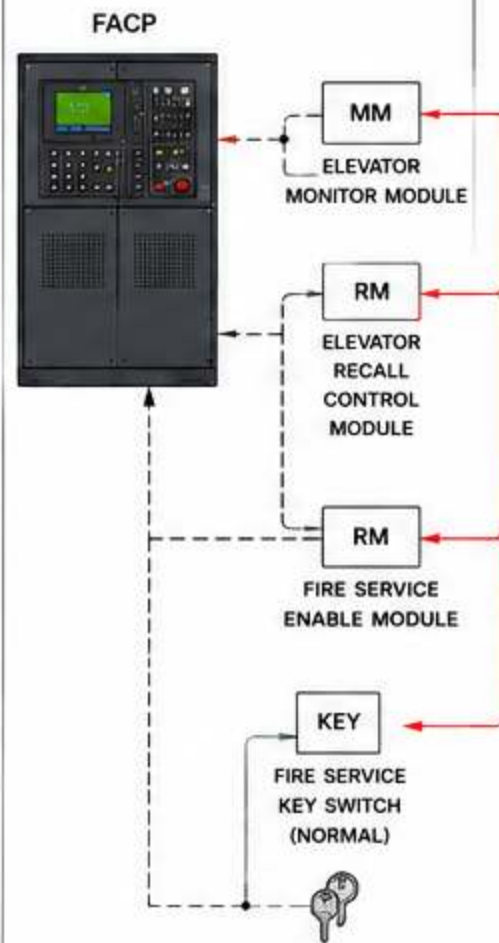
LEGEND

FACP	FIRE ALARM CONTROL PANEL
MM	MONITOR MODULE
RM	RELAY MODULE
FS	FLOW SWITCH
KEY	FIRE SERVICE KEY SWITCH
●	LOBBY / DESIGNATED FLOOR
○	ELEVATOR CAR
---	FIRE ALARM SIGNAL
---	CONTROL / POWER (120VAC)
---	ELEVATOR SIGNAL WIRING
---	BUILDING WIRING

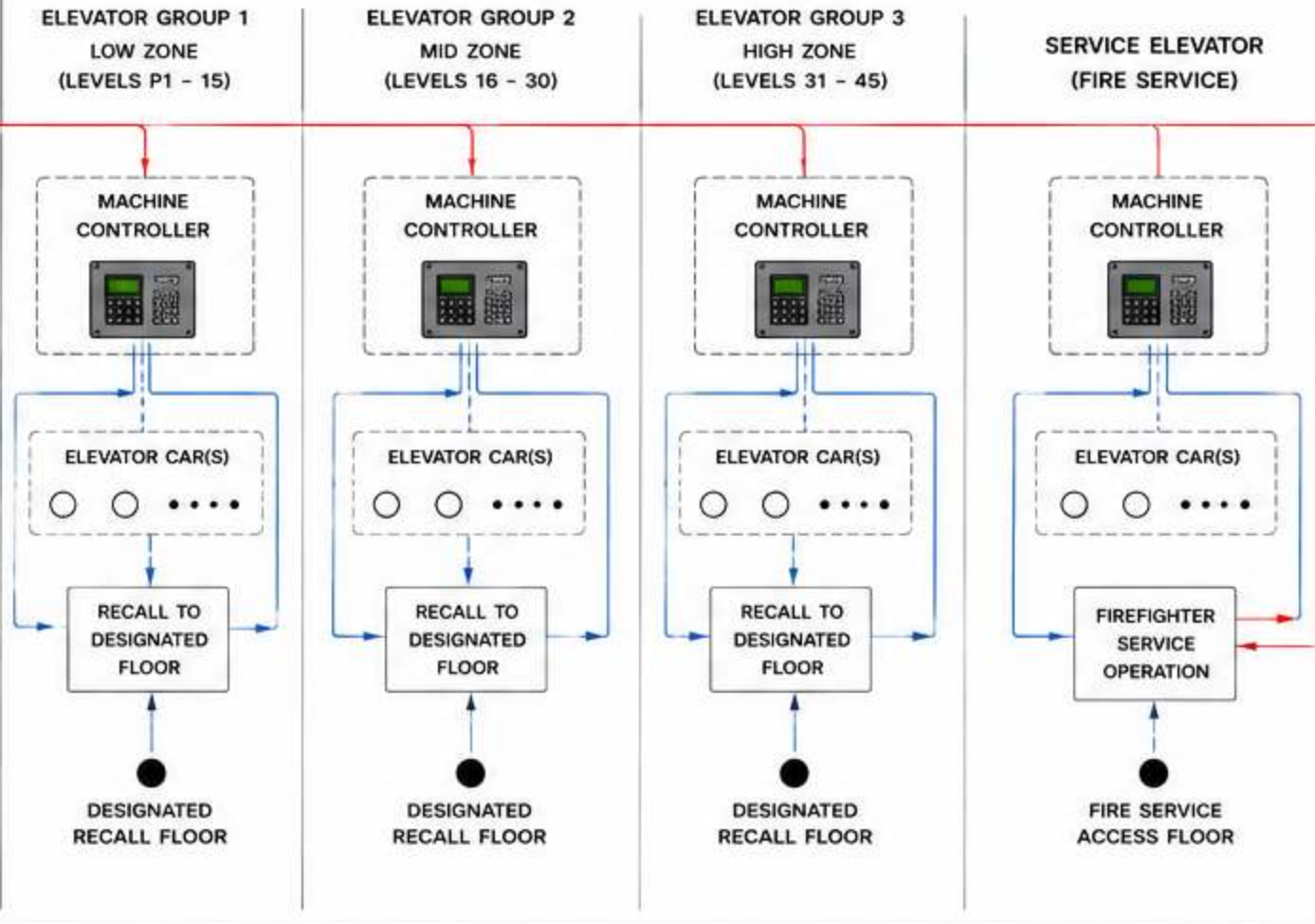
GENERAL NOTES

- ALL ELEVATORS SHALL BE AUTOMATICALLY RECALLED UPON FIRE ALARM.
- ELEVATORS SHALL RETURN TO THE DESIGNATED RECALL FLOOR AND OPEN DOORS.
- ELEVATORS SHALL BE TAKEN OUT OF SERVICE AND SHALL NOT RESPOND TO CALLS.
- FIREFIGHTER SERVICE OPERATION SHALL OVERRIDE NORMAL OPERATION.
- FIRE SERVICE KEY SWITCH SHALL BE LOCATED IN FIRE COMMAND CENTER AND AT DESIGNATED FIRE SERVICE ACCESS LOCATION.
- ELEVATOR SYSTEM SHALL COMPLY WITH ASME A17.1 / CSA B44.

FIRE ALARM SYSTEM



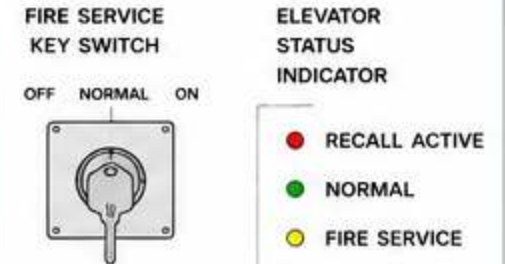
ELEVATOR GROUP CONTROL



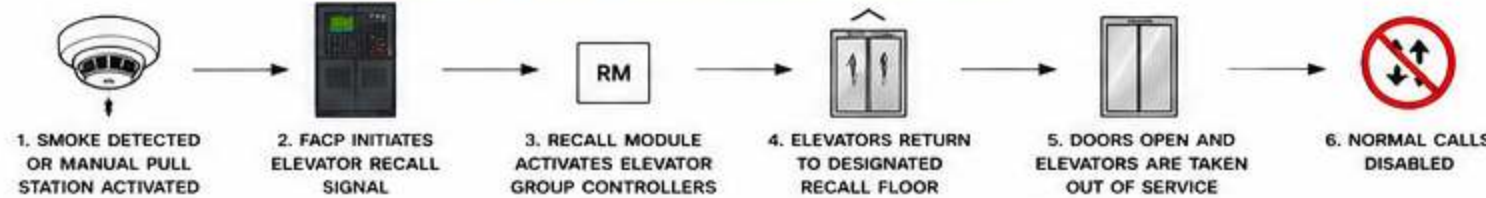
FIRE SERVICE OPERATION

- INSERT FIRE SERVICE KEY AND TURN TO "ON".
- ELEVATOR RESPONDS AS FOLLOWS:
 - BYPASSES RECALL
 - ELEVATOR CAN BE MANUALLY CONTROLLED
 - DOORS CAN BE OPENED AND HELD OPEN
 - ELEVATOR CAN BE SENT TO ANY FLOOR
 - NORMAL CALLS REMAIN DISABLED
- REMOVE KEY AND RETURN SWITCH TO "NORMAL" TO RESTORE RECALL.

TYPICAL FIRE COMMAND CENTER (FIRE SERVICE ACCESS LOCATION)



SEQUENCE OF OPERATION (FIRE ALARM CONDITION)



ELEVATOR WIRING LEGEND

---	FIRE ALARM CONTROL / POWER (120VAC)
---	ELEVATOR SIGNAL WIRING
---	BUILDING WIRING
---	FIRE ALARM SIGNAL (SUPERVISED)

ABBREVIATIONS

FACP	Fire Alarm Control Panel	FC	Fire Command Center
MM	Monitor Module	N.O.	Normally Open
RM	Relay Module	N.C.	Normally Closed
FS	Flow Switch	BMS	Building Management System
KEY	Key Switch	AC	Alternating Current

APPLICABLE STANDARDS

- NFPA 72 – NATIONAL FIRE ALARM CODE (2022)
- NFPA 101 – LIFE SAFETY CODE (2021)
- ASME A17.1 – SAFETY CODE FOR ELEVATORS AND ESCALATORS (2022)
- CAN/CSA B44 – SAFETY CODE FOR ELEVATORS

NOTES

- COORDINATE ALL ELEVATOR INTERFACE REQUIREMENTS WITH ELEVATOR MANUFACTURER.
- PROVIDE DEDICATED MONITORED CIRCUITS FOR ALL ELEVATOR INTERFACE POINTS.
- REFER TO ELEVATOR SHOP DRAWINGS FOR DETAILED WIRING CONNECTIONS.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

ELEVATOR RECALL & FIREFIGHTER SERVICE

FIRE ALARM INTERFACE DIAGRAM

NFPA 72 / NFPA 101 / ASME A17.1 COMPLIANT

DRAWN BY: AEG

CHECKED BY: AEG

APPROVED BY: AEG

SCALE: N.T.S.

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SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

EMERGENCY POWER & BATTERY DIAGRAM

FIRE ALARM & LIFE SAFETY SYSTEM
NFPA 72 / NFPA 110 COMPLIANT

DRAWING NUMBER

FA-DRW-015

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DATE: 05/15/2024

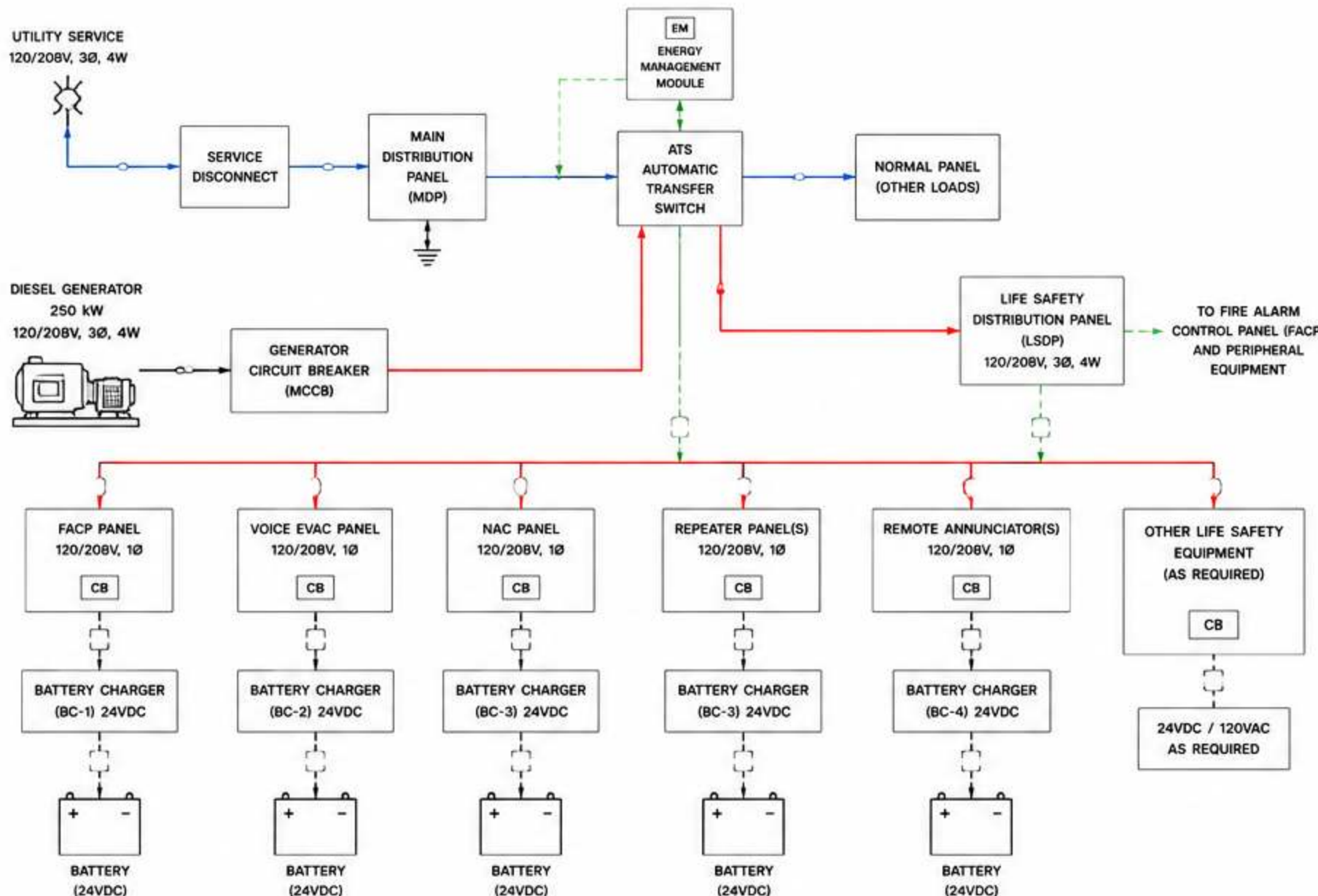
LEGEND

- NORMAL AC POWER
- EMERGENCY AC POWER
- DC BATTERY POWER
- SIGNAL / MONITORING
- EQUIPMENT WIRING
- ATS: AUTOMATIC TRANSFER SWITCH
- EM: ENERGY MANAGEMENT MODULE
- MCCB: MOLDED CASE CIRCUIT BREAKER
- CB: CIRCUIT BREAKER
- F: FUSE
- BC: BATTERY CHARGER
- BATTERY
- EQUIPMENT GROUND

GENERAL NOTES

- FIRE ALARM SYSTEM SHALL REMAIN OPERATIONAL DURING ANY SINGLE FAILURE OF NORMAL POWER.
- ALL LIFE SAFETY BRANCH CIRCUITS SHALL BE POWERED BY THE EMERGENCY SYSTEM.
- BATTERIES SHALL BE MAINTAINED IN ACCORDANCE WITH NFPA 110.
- ALL EQUIPMENT SHALL BE LISTED FOR THE INTENDED APPLICATION.
- REFER TO PANEL SCHEDULE FOR CIRCUIT LOADS AND WIRE SIZES.
- COORDINATE WITH ARCHITECTURAL FOR DEDICATED EQUIPMENT SPACES AND VENTILATION.

POWER DISTRIBUTION SCHEMATIC



BATTERY SYSTEM SUMMARY

SYSTEM VOLTAGE	24 VDC
BATTERY TYPE	VRLA (SEALED LEAD ACID)
AUTONOMY	24 HOURS STANDBY 5 MINUTES ALARM
TEMPERATURE	77°F (25°C)
BATTERY CABINET	NEMA 1
LOCATION	FIRE COMMAND CENTER (EQUIPMENT ROOM)

EMERGENCY POWER SUMMARY

GENERATOR SIZE	250 kW
VOLTAGE / PHASE	120/208V, 3Ø, 4W
FUEL TYPE	DIESEL
RUN TIME @ FULL LOAD	8 HOURS
LOCATION	ROOF LEVEL - WEST
TRANSFER SWITCH TYPE	CLOSED TRANSITION
TRANSFER TIME	< 10 SECONDS

LOAD PRIORITY (ESSENTIAL CIRCUITS)

- FIRE ALARM CONTROL PANEL
- VOICE EVACUATION SYSTEM
- NOTIFICATION APPLIANCE CIRCUITS (NAC)
- SPRINKLER / SUPPRESSION INTERFACE
- SMOKE CONTROL INTERFACE
- REPEATER PANELS
- REMOTE ANNUNCIATORS
- FIRE SERVICE / SMOKE CONTROL DAMPERS
- ELEVATOR RECALL INTERFACE
- OTHER LIFE SAFETY FUNCTIONS

ABBREVIATIONS

ATS	Automatic Transfer Switch	MDP	Main Distribution Panel
BC	Battery Charger	MCCB	Molded Case Circuit Breaker
CB	Circuit Breaker	NAC	Notification Appliance Circuit
EM	Energy Management Module	VRLA	Valve Regulated Lead Acid
FACP	Fire Alarm Control Panel		
LSDP	Life Safety Distribution Panel		

APPLICABLE STANDARDS

- NFPA 72 - NATIONAL FIRE ALARM CODE (2022)
- NFPA 110 - STANDARD FOR EMERGENCY AND STANDBY POWER SYSTEMS (2019)
- NFPA 101 - LIFE SAFETY CODE (2021)
- NFPA 70 - NATIONAL ELECTRICAL CODE (2023)
- UL 864 - CONTROL UNITS AND ACCESSORIES FOR FIRE ALARM SYSTEMS
- UL 1778 - UNINTERRUPTIBLE POWER SUPPLIES

NOTES

- ALL LIFE SAFETY EQUIPMENT SHALL BE POWERED FROM THE EMERGENCY SYSTEM.
- BATTERIES SHALL BE LOCATED IN A TEMPERATURE CONTROLLED AREA.
- TEST GENERATOR AND BATTERIES IN ACCORDANCE WITH NFPA 110.
- PROVIDE DEDICATED GROUNDING IN ACCORDANCE WITH NEC ARTICLE 250.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

EMERGENCY POWER & BATTERY DIAGRAM

NFPA 72 / NFPA 110 COMPLIANT

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SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

ADDRESSABLE SLC LOOP DIAGRAM

FIRE ALARM SYSTEM – SIGNALING LINE CIRCUITS

NFPA 72 / UL 864 COMPLIANT

DRAWING NUMBER

FA-DRW-016

REV: 0

DATE: 05/15/2024

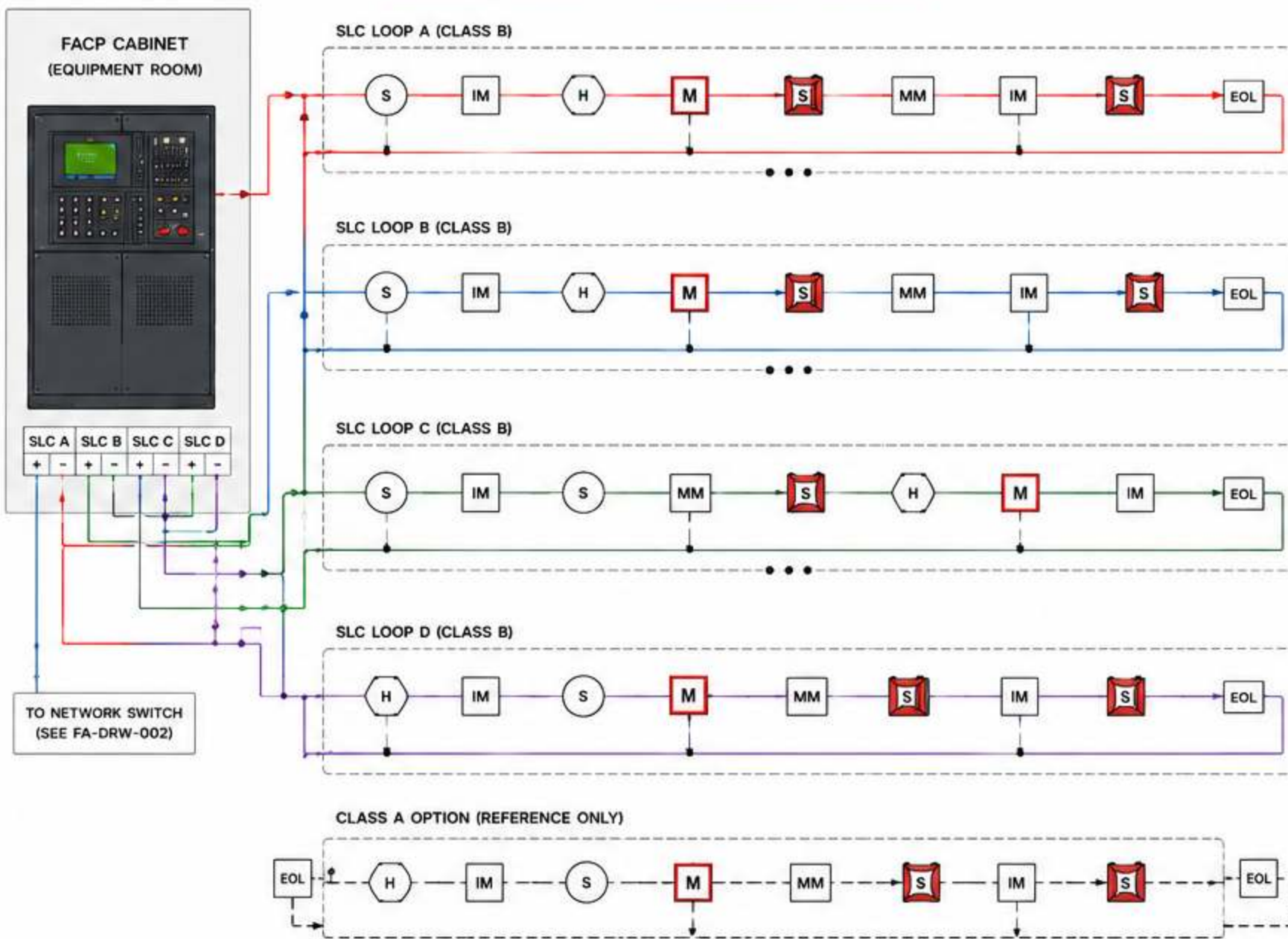
LEGEND

—	SLC LOOP A (CLASS B)
—	SLC LOOP B (CLASS B)
—	SLC LOOP C (CLASS B)
—	SLC LOOP D (CLASS B)
- - -	SLC LOOP (CLASS A OPTION)
	FIRE ALARM CONTROL PANEL
	SMOKE DETECTOR
	HEAT DETECTOR
	ISOLATOR MODULE
	MONITOR MODULE
	MANUAL PULL STATION
	SPEAKER / STROBE
	STROBE
	END OF LINE RESISTOR
	REPEATER PANEL

SLC NOTES

- ALL SLC LOOPS ARE CLASS B CONFIGURATION UNLESS NOTED OTHERWISE.
- MAX DEVICES PER LOOP: 250
- MAX LOOP RESISTANCE: 40 OHMS
- USE TWISTED, SHIELDED PAIR CABLE FOR SLC WIRING.
- MAINTAIN MINIMUM 18" SEPARATION FROM POWER CONDUCTORS.
- REFERENCE FLOOR PLANS FOR DEVICE QUANTITIES AND LOCATIONS.
- ISOLATOR MODULES (IM) ARE INSTALLED TO MAINTAIN CIRCUIT INTEGRITY.
- EOL RESISTOR VALUES PER MANUFACTURER REQUIREMENTS (TYP. 47K OHM).

SLC LOOP WIRING – TYPICAL SEGMENT (CLASS B)



LOOP SUMMARY

LOOP ID	TYPE	HOME	MAX DEVICES	EOL LOCATION
SLC LOOP A	CLASS B	FACP	250	END OF LOOP
SLC LOOP B	CLASS B	FACP	250	END OF LOOP
SLC LOOP C	CLASS B	FACP	250	END OF LOOP
SLC LOOP D	CLASS B	FACP	250	END OF LOOP

DEVICE SUMMARY (PER LOOP MAX)

DEVICE TYPE	MAX QTY
SMOKE DETECTORS (S)	125
HEAT DETECTORS (H)	125
MANUAL PULL STATIONS (M)	125
MONITOR MODULES (MM)	125
ISOLATOR MODULES (IM)	250
SPEAKERS / STROBES (S)	125
STROBES (S)	125

SLC WIRING NOTES

- SLC WIRING SHALL BE IN ACCORDANCE WITH NFPA 72 AND MANUFACTURER REQUIREMENTS.
- USE LISTED FIRE ALARM CABLE: TWISTED, SHIELDED, 18 AWG MINIMUM.
- MAINTAIN SLC CIRCUIT POLARITY (+ / -).
- INSTALL ISOLATOR MODULES TO LIMIT EFFECT OF A SHORT CIRCUIT.
- DO NOT EXCEED MAX LOOP LENGTH OR DEVICE QUANTITIES.

ABBREVIATIONS

FACP	Fire Alarm Control Panel	M	Manual Pull Station
SLC	Signaling Line Circuit	S	Smoke Detector
IM	Isolator Module	H	Heat Detector
MM	Monitor Module	S	Speaker / Strobe
EOL	End Of Line Resistor	AC	Alternating Current

APPLICABLE STANDARDS

- NFPA 72 – NATIONAL FIRE ALARM CODE (2022)
- NFPA 101 – LIFE SAFETY CODE (2021)
- UL 864 – CONTROL UNITS AND ACCESSORIES FOR FIRE ALARM SYSTEMS
- UL 2572 – MASS NOTIFICATION SYSTEMS
- UL 268 – SMOKE DETECTORS FOR FIRE ALARM SYSTEMS

GENERAL NOTES

- REFER TO FLOOR PLANS FOR DEVICE TYPES, QUANTITIES, AND LOCATIONS.
- ALL DEVICES SHALL BE LISTED AND COMPATIBLE WITH FACP.
- LOOP WIRING SHALL BE SUPERVISED AND TROUBLE MONITORED BY FACP.
- MAINTAIN CIRCUIT INTEGRITY FOR RELIABILITY.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

ADDRESSABLE SLC LOOP DIAGRAM

FIRE ALARM SYSTEM – SIGNALING LINE CIRCUITS

NFPA 72 / UL 864 COMPLIANT

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LEGEND

FIRE ALARM SIGNAL

FIRE ALARM SUPERVISORY

BMS/BAS SIGNAL

BMS/BAS SUPERVISORY

ETHERNET (BACnet/IP)

HARDWIRED I/O

INTERFACE OUTPUT MODULE

INTERFACE INPUT MODULE

PROTOCOL GATEWAY

NETWORK / ETHERNET

GENERAL NOTES

1. THE FIRE ALARM SYSTEM SHALL NOT RELY ON THE BMS/BAS FOR ANY FIRE PROTECTION FUNCTION.

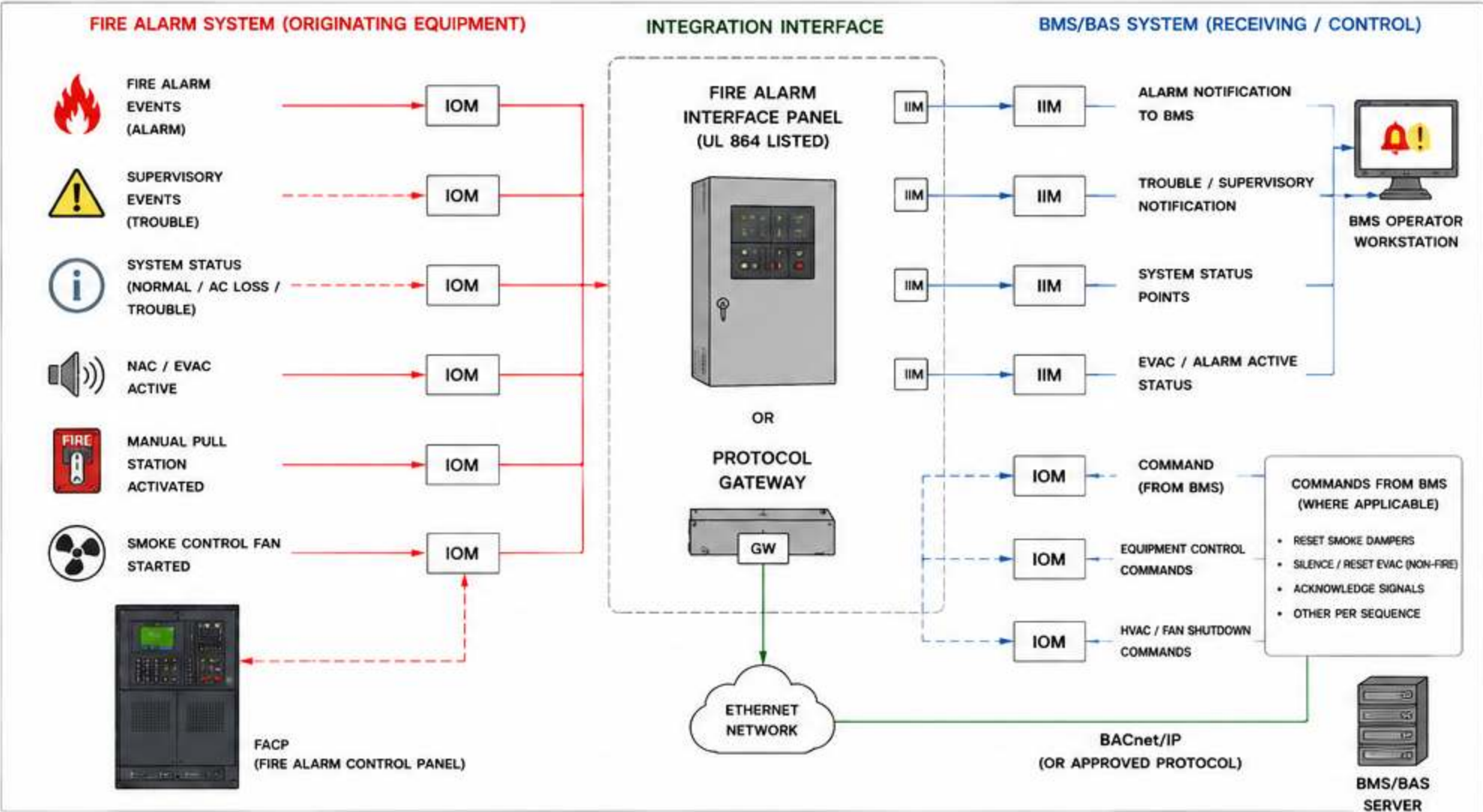
2. FIRE ALARM SIGNALS SHALL BE SUPERVISED TO THE FIRE ALARM CONTROL PANEL (FACP).

3. BMS/BAS COMMANDS SHALL NOT OVERRIDE ANY REQUIRED FIRE ALARM OPERATION.

4. ALL INTERFACE MODULES SHALL BE UL 864 LISTED FOR FIRE PROTECTIVE SIGNALLING SYSTEM SERVICE.

5. COORDINATE ALL POINT NAMES AND POINT DESCRIPTIONS WITH BAS CONTRACTOR.

6. REFER TO SEQUENCE OF OPERATIONS AND CAUSE & EFFECT MATRIX FOR DETAILED FUNCTIONAL BEHAVIOR.





SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

IN-BUILDING RADIO ENHANCEMENT SYSTEM (IBRES/BDA)

FIRE ALARM & LIFE SAFETY SYSTEM – EMERGENCY COMMUNICATIONS

NFPA 72 / IFC 510 / FCC 47 CFR PART 90 COMPLIANT

DRAWING NUMBER

FA-DRW-019

REV: 0

DATE: 05/15/2024

LEGEND

- DONOR ANTENNA (EXTERIOR)
- BIDIRECTIONAL AMPLIFIER (BDA)
- DAS REMOTE UNIT (DRU)
- DAS HUB / POWER SPLITTER
- DAS SERVICE ANTENNA
- COAXIAL CABLE (LOW LOSS)
- FIBER OPTIC CABLE
- ELECTRICAL POWER
- ALARM / MONITORING
- GROUNDING

GENERAL NOTES

- IBRES/BDA SYSTEM SHALL COMPLY WITH IFC 510, NFPA 1221, NFPA 72, AND AHJ REQUIREMENTS.
- SYSTEM SHALL PROVIDE RADIO COVERAGE FOR FIRST RESPONDERS IN ALL AREAS OF THE BUILDING INCLUDING BASEMENT, ELEVATOR SHAFTS, STAIRWELLS, AND PARKING.
- DONOR ANTENNAS SHALL BE INSTALLED A MIN. OF 10' ABOVE THE ROOF AND 10' FROM AIR INTAKES.
- ANTENNAS SHALL BE PLACED TO MAXIMIZE COVERAGE AND MINIMIZE OVERLAP.
- ALL COAX CABLE SHALL BE LOW LOSS (1/2" OR LESS) AND PLENUM RATED.
- SYSTEM SHALL BE MONITORED BY THE FIRE ALARM SYSTEM FOR TROUBLE CONDITIONS.

APPLICABLE CODES & STANDARDS

- IFC 510 – EMERGENCY RESPONDER RADIO COVERAGE
- NFPA 72 – NATIONAL FIRE ALARM CODE
- NFPA 1221 – STANDARD FOR THE INSTALLATION, MAINTENANCE, AND USE OF EMERGENCY SERVICES COMMUNICATION SYSTEMS
- FCC 47 CFR PART 90 – PRIVATE LAND MOBILE RADIO SERVICES

ABBREVIATIONS

AHJ	Authority Having Jurisdiction
BDA	Bidirectional Amplifier
DRU	DAS Remote Unit
FACP	Fire Alarm Control Panel
IBRES	In-Building Radio Enhancement System
DAS	Distributed Antenna System

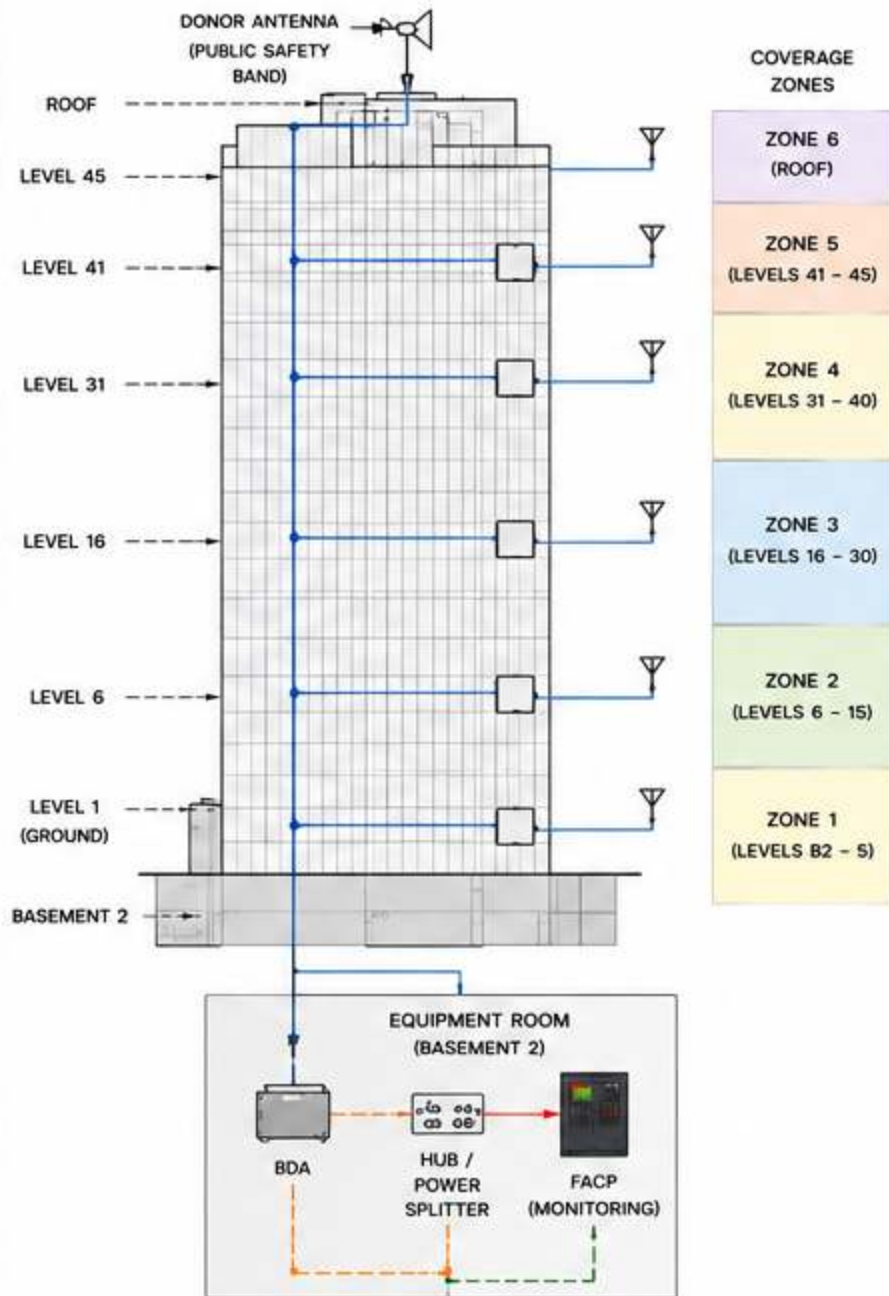
GENERAL NOTES (CONT.)

- ALL EQUIPMENT SHALL BE LISTED FOR THE INTENDED USE AND ENVIRONMENT.
- ALL COAX CABLE ROUTING SHALL MAINTAIN MINIMUM BEND RADIUS AND BE PROPERLY SUPPORTED.
- DONOR ANTENNA SHALL BE WEATHERPROOF AND PROPERLY GROUNDING.
- DOCUMENTATION AND ACCEPTANCE TESTING SHALL BE PROVIDED PER IFC 510.

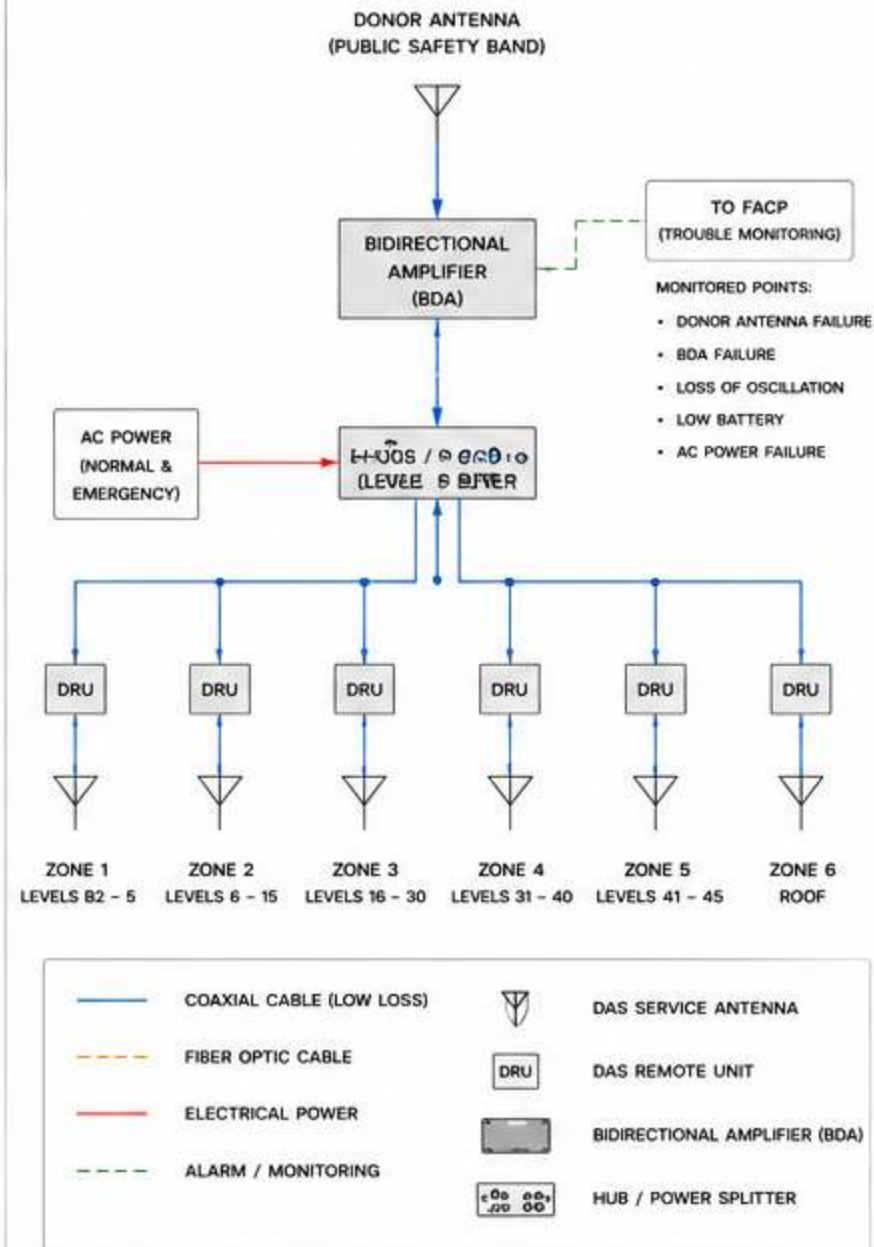
EQUIPMENT ROOM REQUIREMENTS

- LOCATION: BASEMENT 2 – FIRE COMMAND CENTER AREA
- MINIMUM ROOM SIZE: 8'-0" W x 8'-0" D x 8'-0" H
- TEMPERATURE: 32°F TO 104°F (0°C TO 40°C)
- HUMIDITY: 5% TO 95% (NON-CONDENSING)
- AC POWER: NORMAL & EMERGENCY POWER SUPPLIED
- ACCESS: SECURED, ACCESSIBLE 24/7

SYSTEM ANTENNA DISTRIBUTION – BUILDING ELEVATION



IBRES/BDA SYSTEM BLOCK DIAGRAM



PUBLIC SAFETY FREQUENCY BANDS

BAND	FREQUENCY RANGE (MHz)	DIRECTION
700 MHz BAND	769 – 776 / 799 – 806	UPLINK / DOWNLINK
800 MHz BAND	806 – 824 / 851 – 869	UPLINK / DOWNLINK
VHF LOW BAND	150 – 174	UPLINK / DOWNLINK
VHF HIGH BAND	450 – 512	UPLINK / DOWNLINK
UHF BAND	406 – 512	UPLINK / DOWNLINK

SYSTEM COMPONENT SUMMARY

COMPONENT	QTY
DONOR ANTENNA (ROOF)	1
BIDIRECTIONAL AMPLIFIER (BDA)	1
HUB / POWER SPLITTER	1
DAS REMOTE UNIT (DRU)	6
DAS SERVICE ANTENNA	~120
COAXIAL CABLE (LOW LOSS)	AS REQUIRED
FIBER OPTIC CABLE	AS REQUIRED
AC POWER SUPPLY / BATTERY BACKUP	1
FACP MONITORING INTERFACE	1

SYSTEM PERFORMANCE REQUIREMENTS

- MINIMUM 95% RADIO COVERAGE IN ALL DESIGNATED AREAS.
- MINIMUM -95 dBm SIGNAL STRENGTH FOR PUBLIC SAFETY COMMUNICATIONS.
- SYSTEM SHALL SUPPORT ALL REQUIRED PUBLIC SAFETY FREQUENCY BANDS.
- BATTERY BACKUP SHALL PROVIDE A MINIMUM OF 24 HOURS STANDBY AND 1 HOUR ALARM.
- SYSTEM SHALL BE TESTED AND CERTIFIED PER IFC 510.

ACRONYMS

IBRES	In-Building Radio Enhancement System
BDA	Bidirectional Amplifier
DRU	DAS Remote Unit
FACP	Fire Alarm Control Panel
DAS	Distributed Antenna System
FCC	Federal Communications Commission

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

IN-BUILDING RADIO ENHANCEMENT SYSTEM (IBRES/BDA)

EMERGENCY COMMUNICATIONS

NFPA 72 / IFC 510 / FCC 47 CFR PART 90 COMPLIANT

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SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

EMERGENCY COMMUNICATIONS TWO-WAY SYSTEM

FIRE ALARM & LIFE SAFETY SYSTEM – EMERGENCY RESPONDER COMMUNICATIONS (ERCES)

NFPA 1221 / IFC 510 COMPLIANT

DRAWING NUMBER

FA-DRW-020

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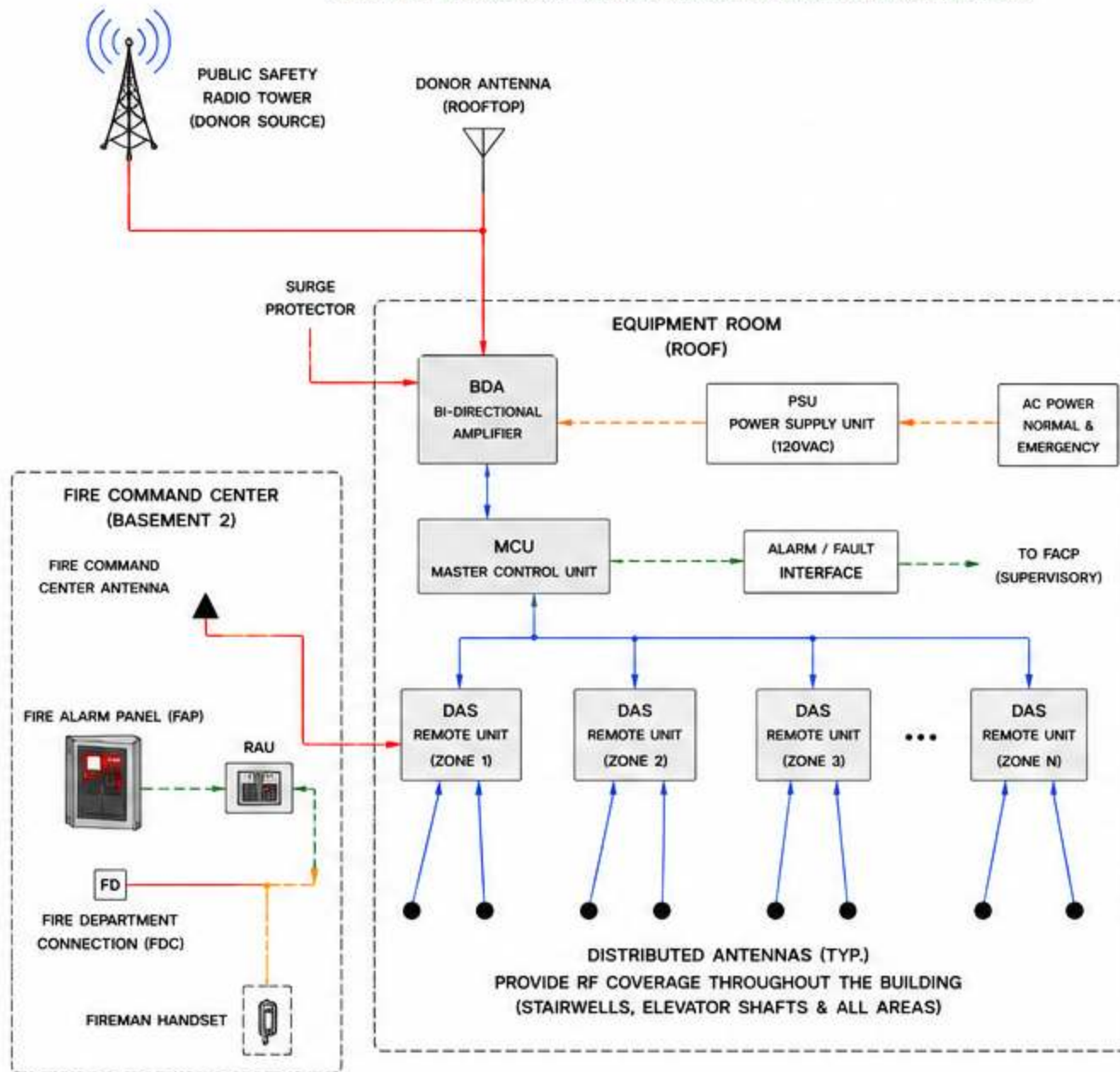
LEGEND

	RF COAXIAL CABLE
	CAT6 / ETHERNET CABLE
	CONTROL / ALARM WIRING
	120VAC POWER
	BI-DIRECTIONAL AMPLIFIER
	DISTRIBUTED ANTENNA SYSTEM
	POWER SUPPLY UNIT
	MASTER CONTROL UNIT
	FIRE ALARM PANEL
	REMOTE ANNUNCIATOR UNIT
	ANTENNA (DONOR OR DAS)
	ANTENNA (DISTRIBUTED)
	FIRE COMMAND CENTER ANTENNA
	FIRE DEPARTMENT CONNECTION
	FIREMAN HANDSET
	SURGE PROTECTOR / GROUND

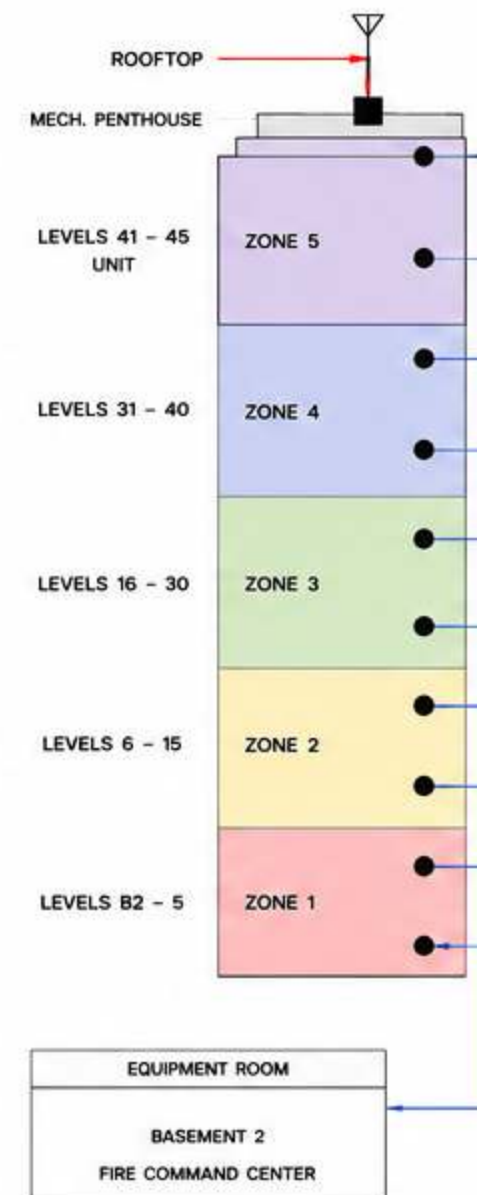
GENERAL NOTES

- SYSTEM SHALL COMPLY WITH NFPA 1221, IFC 510 AND AHJ REQUIREMENTS.
- SYSTEM SHALL PROVIDE EMERGENCY RESPONDER RADIO COVERAGE IN ALL AREAS AS REQUIRED.
- DONOR ANTENNA SHALL BE LOCATED TO PROVIDE CLEAR RF LINE-OF-SIGHT TO THE SERVING PUBLIC SAFETY RADIO TOWER.
- ALL DAS ANTENNAS SHALL BE APPROVED FOR IN-BUILDING USE.
- ALL COMPONENTS SHALL BE LISTED FOR FIRE PROTECTIVE SIGNALLING SERVICE.

TWO-WAY EMERGENCY COMMUNICATIONS SYSTEM ARCHITECTURE



BUILDING SECTION



SYSTEM COMPONENT SUMMARY

COMPONENT	QTY
DONOR ANTENNA (ROOF)	1
BI-DIRECTIONAL AMPLIFIER (BDA)	1
MASTER CONTROL UNIT (MCU)	1
POWER SUPPLY UNIT (PSU)	1
DAS REMOTE UNITS	AS SHOWN
DISTRIBUTED ANTENNAS (DAS)	AS SHOWN
FIRE COMMAND CENTER ANTENNA	1
FIRE DEPARTMENT CONNECTION (FDC)	1
FIREMAN HANDSET	1
REMOTE ANNUNCIATOR UNIT (RAU)	1

DAS COVERAGE ZONES

ZONE	FLOOR LEVELS	DESCRIPTION
1	B2 – 5	LOW ZONE
2	6 – 15	MID-LOW ZONE
3	16 – 30	MID ZONE
4	31 – 40	MID-HIGH ZONE
5	41 – 45	HIGH ZONE

SYSTEM FEATURES

- ENHANCES PUBLIC SAFETY RADIO SIGNALS THROUGHOUT THE BUILDING.
- SUPPORTS MULTIPLE PUBLIC SAFETY FREQUENCY BANDS.
- PROVIDES TWO-WAY COMMUNICATIONS FOR FIRST RESPONDERS.
- SUPERVISED AND MONITORED BY FIRE ALARM SYSTEM.
- BATTERY BACKUP PROVIDED FOR 24 HOURS STANDBY AND 1 HOUR ALARM (MINIMUM).

ABBREVIATIONS

AHJ	Authority Having Jurisdiction
BDA	Bi-Directional Amplifier
DAS	Distributed Antenna System
ERCES	Emergency Responder Communication Enhancement System
FACP	Fire Alarm Control Panel
FDC	Fire Department Connection
MCU	Master Control Unit
PSU	Power Supply Unit
RAU	Remote Annunciator Unit

APPLICABLE CODES & STANDARDS

- NFPA 1221 – STANDARD FOR THE INSTALLATION, MAINTENANCE, AND USE OF EMERGENCY SERVICES COMMUNICATION SYSTEMS
- IFC 510 – EMERGENCY RESPONDER RADIO COVERAGE
- NFPA 72 – NATIONAL FIRE ALARM CODE
- FCC 47 CFR PART 90 – PRIVATE LAND MOBILE RADIO SERVICES
- ALL APPLICABLE LOCAL AMENDMENTS

INSTALLATION NOTES

- ALL COAXIAL CABLE SHALL BE LOW LOSS (1/2" OR LESS) AND PLENUM RATED.
- PROVIDE FIRESTOPPING AT ALL PENETRATIONS.
- ANTENNAS SHALL BE MOUNTED PER MANUFACTURER RECOMMENDATIONS.
- VERIFY RADIO FREQUENCIES AND POWER LEVELS WITH AHJ.
- SYSTEM SHALL BE TESTED AND CERTIFIED PER NFPA 1221.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

EMERGENCY COMMUNICATIONS TWO-WAY SYSTEM

EMERGENCY RESPONDER COMMUNICATIONS (ERCES)

NFPA 1221 / IFC 510 COMPLIANT

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SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

DATA CENTER PROTECTION LAYOUT

FIRE ALARM & LIFE SAFETY SYSTEM – SPECIAL HAZARD PROTECTION
NFPA 75 / NFPA 72 / ISO 14520 COMPLIANT

DRAWING NUMBER

FA-DRW-021

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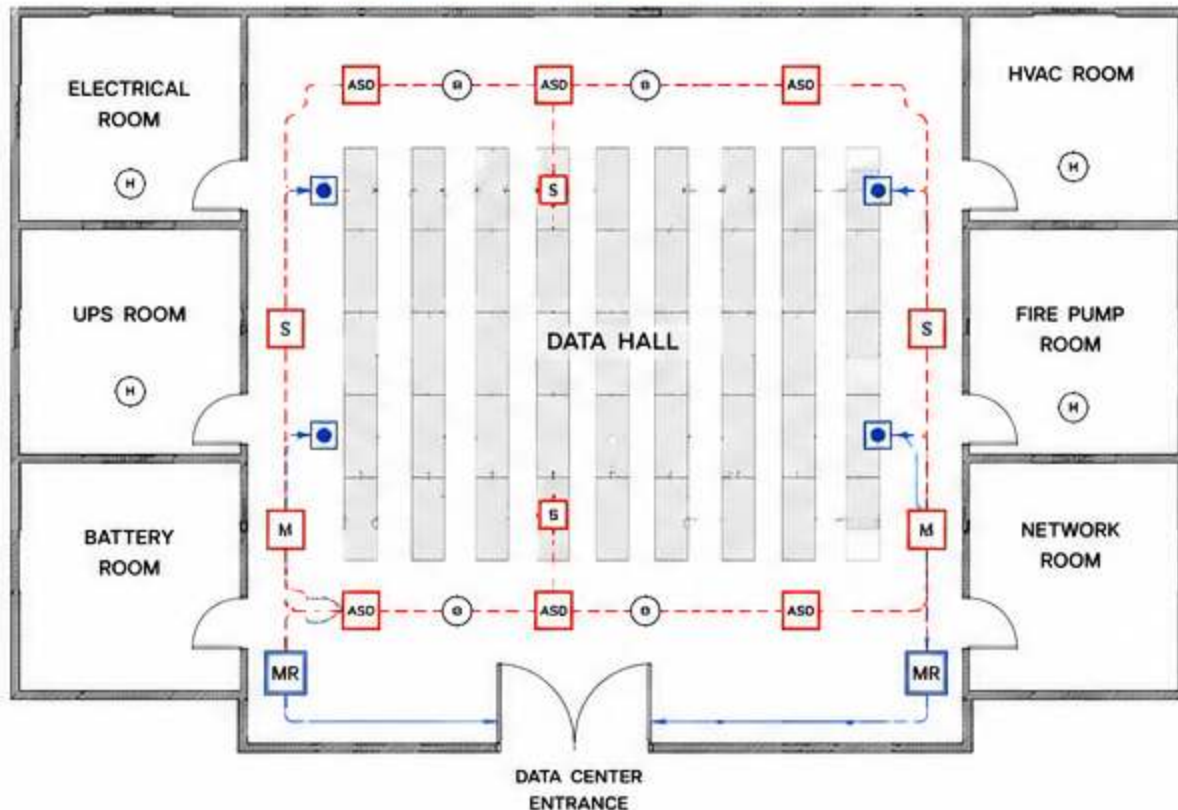
LEGEND

- ADDRESSABLE SMOKE DETECTOR (ASD)
- ASD AIR SAMPLING SMOKE DETECTOR (ASD)
- Ⓜ HEAT DETECTOR
- M MANUAL PULL STATION
- Ⓢ HORN / STROBE
- S VISUAL ALARM DEVICE (STROBE)
- Ⓜ GAS DISCHARGE NOZZLE
- Ⓢ GAS DISCHARGE HORN / STROBE
- MR GAS DISCHARGE MANUAL RELEASE
- FACP FACP (DATA CENTER)
- SLC LOOP (CLASS B)
- - - NAC CIRCUIT
- RELEASE CIRCUIT
- - - GAS MONITORING / FEEDBACK
- - - NETWORK / COMMUNICATION

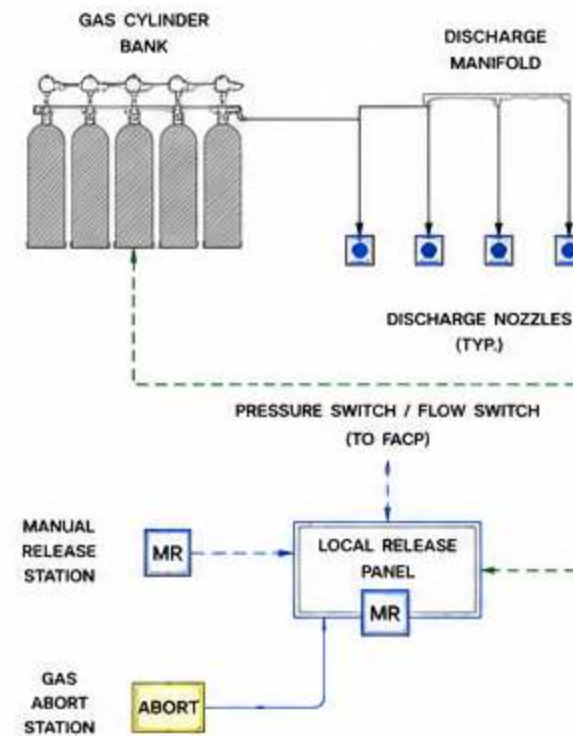
GENERAL NOTES

- SYSTEM DESIGNED IAW NFPA 75, NFPA 72, AND ISO 14520 STANDARDS.
- DATA CENTER PROTECTED BY CLEAN AGENT FIRE SUPPRESSION SYSTEM.
- AIR SAMPLING SMOKE DETECTION (ASD) SHALL PROVIDE EARLY WARNING.
- ALL PENETRATIONS SHALL BE FIRESTOPPED IAW NFPA 75 REQUIREMENTS.
- GAS DISCHARGE SHALL SHUT DOWN HVAC AND ELECTRICAL EQUIPMENT IAW SEQUENCE.
- SYSTEM SHALL BE SUPERVISED AND MONITORED BY BUILDING FACP AND BMS.

DATA CENTER FLOOR PLAN (TYPICAL)



CLEAN AGENT SYSTEM (REFERENCE SCHEMATIC)



SYSTEM COMPONENT SUMMARY

COMPONENT	QTY
AIR SAMPLING SMOKE DETECTORS (ASD)	8
ADDRESSABLE SMOKE DETECTORS	12
HEAT DETECTORS	4
MANUAL PULL STATIONS	2
HORN / STROBE UNITS	6
VISUAL STROBE UNITS	6
GAS DISCHARGE NOZZLES	12
GAS DISCHARGE HORN / STROBES	4
MANUAL RELEASE STATIONS	2
GAS CYLINDER BANK (FK-5-1-12)	1
LOCAL RELEASE PANEL	1
GAS ABORT STATION	1

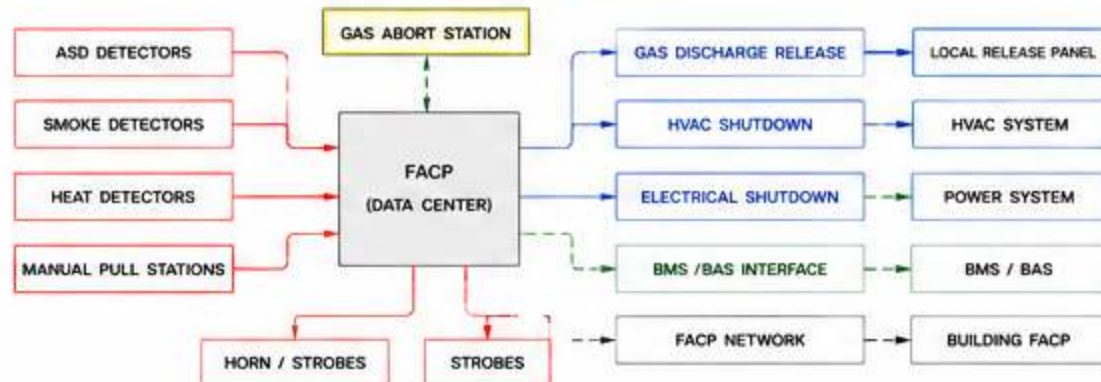
DESIGN CRITERIA

AGENT TYPE:	FK-5-1-12 (NOVEC 1230)
DESIGN CONCENTRATION:	4.2%
NOZZLE DISCHARGE TIME:	10 SECONDS
MAXIMUM ROOM LEAKAGE:	20%
HOLDING TIME:	10 MINUTES
TEMPERATURE RANGE:	32°F TO 120°F

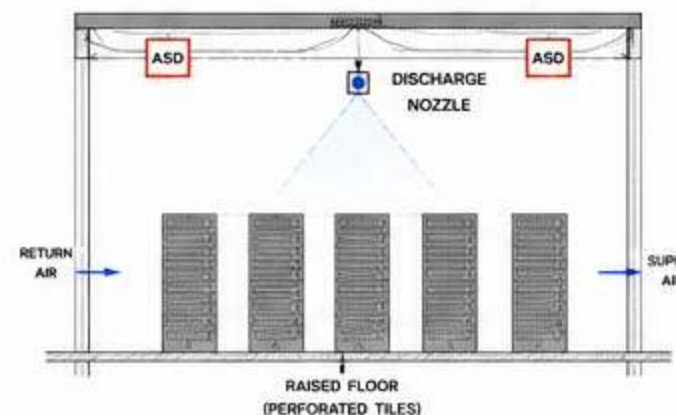
OPERATION SEQUENCE (FIRE CONDITION)

- ASD DETECTS SMOKE IN DATA HALL.
- PRE-ALARM AND ALERT SENT TO FACP AND BMS.
- AUDIO / VISUAL ALARMS ACTUATE.
- HVAC SHUTDOWN AND DAMPERS CLOSE.
- STAFF EVACUATION AND AREA CHECK.
- MANUAL RELEASE STATION ACTIVATED (DELAY).
- GAS DISCHARGE HORN / STROBES ACTIVATE.
- CLEAN AGENT DISCHARGE.
- SYSTEM SUPERVISED FOR POST-DISCHARGE MONITORING AND RESET.

SYSTEM INTERFACE DIAGRAM



SECTION VIEW - DATA HALL (TYP.)



ABBREVIATIONS

ASD	Air Sampling Smoke Detector
BAS	Building Automation System
BMS	Building Management System
FACP	Fire Alarm Control Panel
HVAC	Heating, Ventilation, and Air Conditioning
MR	Manual Release
NAC	Notification Appliance Circuit
SLC	Signaling Line Circuit

APPLICABLE CODES & STANDARDS

- NFPA 75 – STANDARD FOR THE FIRE PROTECTION OF INFORMATION TECHNOLOGY EQUIPMENT
- NFPA 72 – NATIONAL FIRE ALARM CODE
- ISO 14520 – GASEOUS FIRE EXTINGUISHING SYSTEMS
- IFC 2021 – INTERNATIONAL FIRE CODE
- ASHRAE TC 9.9 – DATA CENTER DESIGN GUIDE

GENERAL NOTES (CONT.)

- ALL DEVICES SHALL BE ADDRESSABLE AND SUPERVISED.
- MAINTAIN MINIMUM 24" CLEAR ACCESS IN DATA HALL.
- DO NOT STORE COMBUSTIBLE MATERIALS IN DATA HALL.
- ANNUAL TESTING OF CLEAN AGENT SYSTEM REQUIRED.
- COORDINATE ALL SHUTDOWN SEQUENCES WITH BUILDING OPERATIONS.

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

DATA CENTER PROTECTION LAYOUT

SPECIAL HAZARD PROTECTION

NFPA 75 / NFPA 72 / ISO 14520 COMPLIANT

DRAWN BY:

AEG

CHECKED BY:

AEG

APPROVED BY:

AEG

SCALE:

N.T.S.

SHEET:

1 OF 1

LEGEND

—

SLC LOOP (CLASS B)

—

NAC CIRCUIT (CLASS B)

—

AUDIO / VOICE (CLASS B)

CONTROL / ALARM WIRING

NETWORK / COMMUNICATION

FACP

FIRE ALARM CONTROL PANEL

RAU

REMOTE ANNUNCIATOR UNIT

NAC

NOTIFICATION APPLIANCE CIRCUIT

MD

MONITOR MODULE

MM

MONITOR MODULE (DUAL)

CM

CONTROL MODULE

ISO

SHORT CIRCUIT ISOLATOR

[Speaker]

HORN / STROBE

[Speaker]

SPEAKER / STROBE

S

SMOKE DETECTOR

H

HEAT DETECTOR

P

MANUAL PULL STATION

D

DUCT SMOKE DETECTOR

EOL

END OF LINE DEVICE

GENERAL NOTES

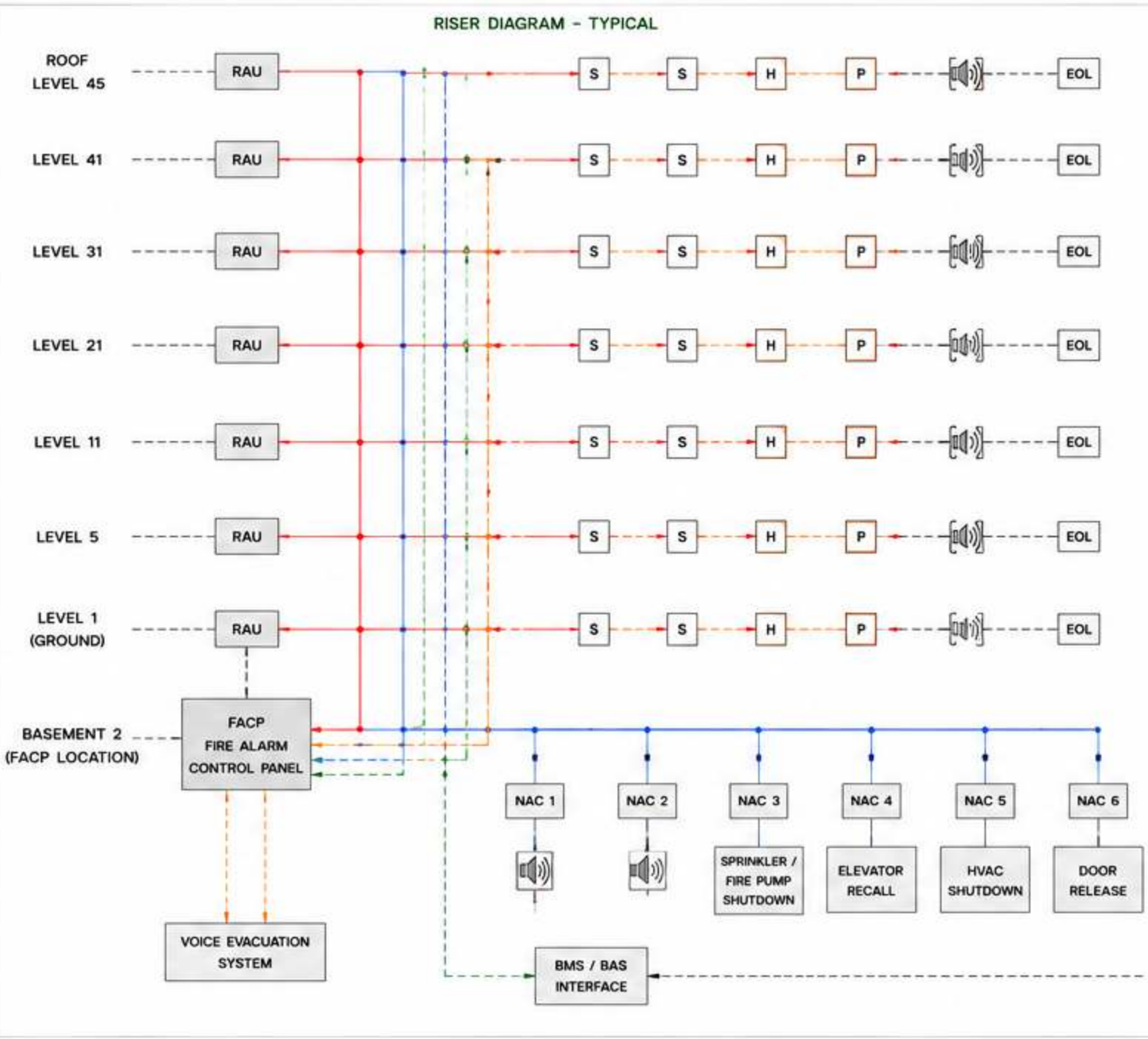
1. ALL SLC LOOPS ARE CLASS B STYLE 4 (U.N.O.).

2. NAC CIRCUITS ARE CLASS B STYLE Y (U.N.O.).

3. ALL FLOOR DEVICES ARE T-TAPPED FROM RISER CIRCUITS.

4. ISOLATORS ARE INSTALLED PER MANUFACTURER RECOMMENDATIONS.

5. REFER TO FLOOR PLANS FOR DEVICE QUANTITIES AND LOCATIONS.



SYSTEM CIRCUIT SUMMARY					
CIRCUIT TYPE	NO. OF CIRCUITS	TYPE	WIRE	FROM	TO
SLC LOOP	2	CLASS B	18 AWG	FACP	LAST DEVICE + EOL
NAC 1	1	CLASS B	14 AWG	FACP	HORNS / STROBES
NAC 2	1	CLASS B	14 AWG	FACP	SPEAKERS / STROBES
NAC 3	1	CLASS B	14 AWG	FACP	SPRINKLER SHUTDOWN
NAC 4	1	CLASS B	14 AWG	FACP	ELEVATOR RECALL
NAC 5	1	CLASS B	14 AWG	FACP	HVAC SHUTDOWN
NAC 6	1	CLASS B	14 AWG	FACP	DOOR RELEASE
AUDIO / VOICE	1	CLASS B	18 AWG	FACP	VOICE EVAC SYSTEM
NETWORK	1	CLASS B	CAT 6	FACP	BMS / BAS
FACP POWER	1	DEDICATED	12 AWG	PANEL	120VAC SOURCE

RISER DIAGRAM NOTES

• ALL INITIATING DEVICE CIRCUITS (SLC) ARE SUPERVISED.

• ALL NOTIFICATION APPLIANCE CIRCUITS (NAC) ARE SUPERVISED.

• END-OF-LINE DEVICES (EOL) ARE INSTALLED AT THE LAST DEVICE ON EACH CIRCUIT.

• EACH FLOOR HAS A REMOTE ANNUNCIATOR UNIT (RAU) FOR FIRE ALARM INDICATION.

• FACP IS LOCATED IN BASEMENT 2 FIRE COMMAND CENTER.

• VOICE EVACUATION SYSTEM IS INTEGRATED WITH FACP.

• SYSTEM INTERFACE WITH BMS/BAS VIA APPROVED PROTOCOL.

RISER LEGEND (SYMBOLS)

S

S

H

P

[Speaker]

EOL

SLC LOOP (CLASS B)

[Speaker]

[Speaker]

EOL

NAC CIRCUIT (CLASS B)

[Speaker]

[Speaker]

EOL

AUDIO / VOICE (CLASS B)

CM

CM

EOL

BMS

EOL

ABBREVIATIONS

BAS

Building Automation System

BMS

Building Management System

CM

Control Module

EOL

End Of Line

FACP

Fire Alarm Control Panel

HVAC

Heating, Ventilation, Air Conditioning

MD

Monitor Module

MM

Monitor Module (Dual)

NAC

Notification Appliance Circuit

RAU

Remote Annunciator Unit

SLC

Signaling Line Circuit

APPLICABLE STANDARDS

• NFPA 72 - NATIONAL FIRE ALARM CODE (2022)

• NFPA 101 - LIFE SAFETY CODE (2021)

• ASHRAE 135 - BACnet® A DATA COMMUNICATION PROTOCOL FOR BUILDING AUTOMATION AND CONTROL NETWORKS

• IFC 510 - EMERGENCY RESPONDER RADIO COVERAGE

• ISO 14520 - GASEOUS FIRE EXTINGUISHING SYSTEMS

DESIGN BASIS

• 24 HOUR BUILDING OCCUPANCY

• FULLY SUPERVISED FIRE ALARM SYSTEM

• CLASS B INITIATING AND NOTIFICATION CIRCUITS

• VOICE EVACUATION PER NFPA 72

• SYSTEM INTEGRATION WITH BMS/BAS

• PROVIDE REDUNDANCY AND RELIABILITY

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

FIRE ALARM RISER DIAGRAM

NFPA 72 / NFPA 101 / ASHRAE 135 COMPLIANT

DRAWN BY:

AEG

CHECKED BY:

AEG

APPROVED BY:

AEG

SCALE:

N.T.S.

SHEET:

1 OF 1

REMOTE ANNUNCIATOR PANEL LAYOUT

FIRE ALARM & LIFE SAFETY SYSTEM
NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

DRAWING NUMBER
FA-DRW-023

REV: 0 DATE: 05/15/2024

PANEL OVERVIEW

REMOTE ANNUNCIATOR PANEL (RAP) PROVIDES SYSTEM STATUS, ALARMS AND SUPERVISORY INDICATIONS FROM THE FIRE ALARM CONTROL PANEL (FACP).

- LOCATED AT FIRE COMMAND CENTERS, LOBBIES AND MANAGER'S OFFICES.
- CONNECTED TO FACP VIA NETWORK.
- MIRRORS ALL POINT STATUS AND EVENTS.
- PROVIDES ACKNOWLEDGE, SILENCE AND LAMP TEST FUNCTIONS.

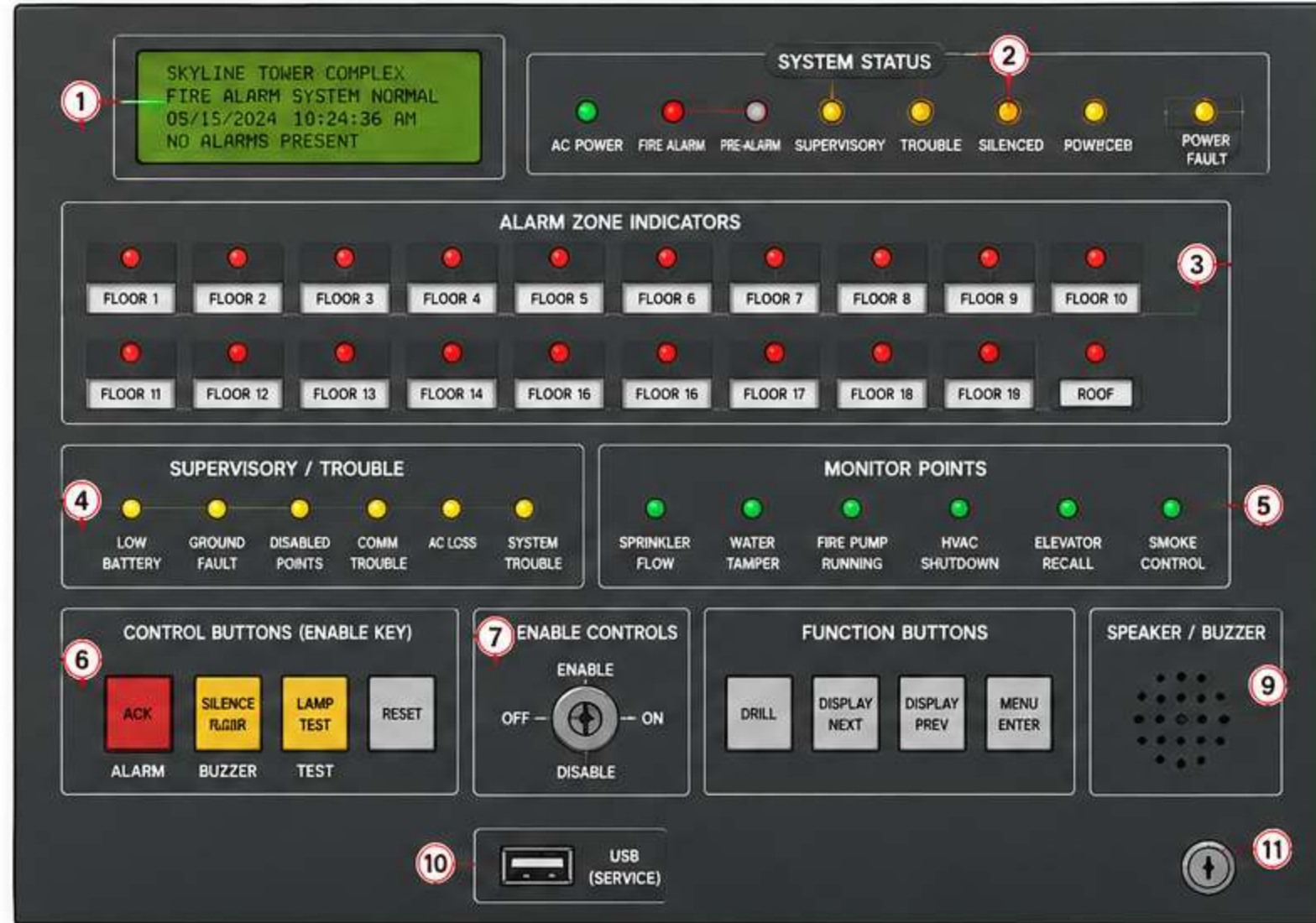
LEGEND

- LCD DISPLAY (4 LINES X 40 CHARACTERS)
- SYSTEM STATUS INDICATORS
- ALARM INDICATORS (RED)
- SUPERVISORY / TROUBLE INDICATORS (YELLOW)
- MONITOR POINT INDICATORS (GREEN)
- CONTROL BUTTONS
- KEY SWITCH (ENABLE CONTROLS)
- FUNCTION BUTTONS
- LOCAL BUZZER (SILENCEABLE)
- USB SERVICE PORT (LOCAL)
- PANEL DOOR / LOCK

GENERAL NOTES

- RAP SHALL BE U.L. LISTED FOR FIRE ALARM SERVICE (UL 864).
- RAP SHALL RECEIVE ALL POINT STATUS, ALARMS, TROUBLES AND SUPERVISORY EVENTS FROM THE FACP.
- ANNUNCIATOR SHALL BE CAPABLE OF ACKNOWLEDGE, SIGNAL SILENCE AND LAMP TEST FUNCTIONS.
- KEY SWITCH SHALL ENABLE CONTROLS TO PREVENT UNAUTHORIZED OPERATION.
- DISPLAY CONTRAST SHALL BE ADJUSTABLE.
- ALL BUTTONS SHALL HAVE POSITIVE TACTILE FEEDBACK.
- PANEL SHALL BE SURFACE OR FLUSH MOUNTED AS SHOWN.

REMOTE ANNUNCIATOR PANEL (FRONT VIEW)



FINISH: TEXTURED CHARCOAL GRAY
MOUNTING: SURFACE MOUNT (SHOWN) / FLUSH MOUNT (OPTIONAL)
DIMENSIONS: 16.0" H x 20.0" W x 3.5" D



INDICATOR FUNCTIONS

INDICATOR	COLOR	FUNCTION
AC POWER	GREEN	AC POWER PRESENT
FIRE ALARM	RED	FIRE ALARM CONDITION
PRE-ALARM	RED	PRE-ALARM CONDITION
SUPERVISORY	YELLOW	SUPERVISORY CONDITION
TROUBLE	YELLOW	TROUBLE CONDITION
SILENCED	YELLOW	ALARM SIGNALS SILENCED
POWER FAULT	YELLOW	POWER SUPPLY FAULT

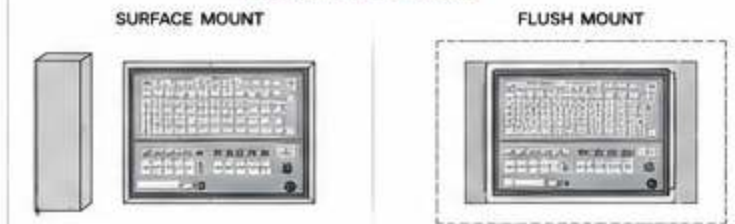
CONTROL BUTTON FUNCTIONS

BUTTON	COLOR	FUNCTION
ACK ALARM	RED	ACKNOWLEDGE ALARMS
SILENCE BUZZER	YELLOW	SILENCE AUDIBLE SIGNALS
LAMP TEST	YELLOW	TEST ALL LED INDICATORS
RESET	GRAY	SYSTEM RESET (IF ENABLED)

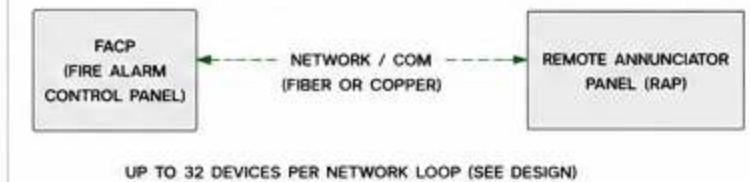
AUDIO / VISUAL SIGNALS

BUZZER PATTERN (ALARM):	TEMPORAL 3 (NFPA 72)
BUZZER PATTERN (TROUBLE):	CONTINUOUS
DEFAULT BUZZER OUTPUT:	85 dBA @ 10 FT (MIN)
DISPLAY BACKLIGHT:	ADJUSTABLE

MOUNTING OPTIONS



COMMUNICATION CONNECTION



ABBREVIATIONS

AC	Alternating Current	COM	Communication
ACK	Acknowledge	HVAC	Heating, Ventilation, and Air Conditioning
FACP	Fire Alarm Control Panel	NFPA	National Fire Protection Association
LED	Light Emitting Diode		
RAP	Remote Annunciator Panel		
UL	Underwriters Laboratories		

APPLICABLE CODES & STANDARDS

- NFPA 72 - NATIONAL FIRE ALARM CODE (2022)
- IFC 510 - FIRE ALARM AND DETECTION SYSTEMS
- IBC 907.6.3 - FIRE COMMAND CENTER
- UL 864 - STANDARD FOR CONTROL UNITS AND ACCESSORIES FOR FIRE ALARM SYSTEMS
- UL 1076 - PROPRIETARY ALARM UNITS

INSTALLATION NOTES

- MOUNT AT 48" A.F.F. TO TOP OF PANEL (TYPICAL).
- PROVIDE DEDICATED 120VAC POWER.
- NETWORK CABLE: SEE FA-DRW-024 FOR CABLE SCHEDULE.
- MAINTAIN 36" CLEAR WORKING SPACE IN FRONT.
- COORDINATE LOCATION WITH ARCHITECTURAL ELEVATIONS.
- LABEL PANEL AS "FIRE ALARM ANNUNCIATOR".

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

REMOTE ANNUNCIATOR PANEL LAYOUT

NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

DRAWN BY: AEG

CHECKED BY: AEG

APPROVED BY: AEG

SCALE: N.T.S.

SHEET: 1 OF 1

CABLE SCHEDULE (AS-BUILT)

FIRE ALARM & LIFE SAFETY SYSTEM
NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

CABLE TAG	SERVICE / CIRCUIT	FROM	TO	CABLE TYPE	CONDUIT / PATH	# OF COND.	AWG / SIZE	SHIELD	JACKET	INSTALLATION METHOD	MAX. LENGTH (ft)	ACTUAL LENGTH (ft)	REMARKS
SLC-1A	SLC LOOP 1 (CLASS B)	FACP (BASEMENT 2)	SLC DEVICE (LEVEL 5)	FPLR / FPL	1" EMT / SHAFT S1	2	18 AWG	NO	PLENUM	EMT CONDUIT	10,000	3,245	LOOP CONTINUES TO LEVEL 22
SLC-1B	SLC LOOP 1 (CLASS B)	FACP (BASEMENT 2)	SLC DEVICE (LEVEL 23)	FPLR / FPL	1" EMT / SHAFT S1	2	18 AWG	NO	PLENUM	EMT CONDUIT	10,900	2,980	END OF LOOP
SLC-2A	SLC LOOP 2 (CLASS B)	FACP (BASEMENT 2)	SLC DEVICE (LEVEL 6)	FPLR / FPL	1" EMT / SHAFT S2	2	18 AWG	NO	PLENUM	EMT CONDUIT	10,000	3,110	LOOP CONTINUES TO LEVEL 24
SLC-2B	SLC LOOP 2 (CLASS B)	FACP (BASEMENT 2)	SLC DEVICE (LEVEL 24)	FPLR / FPL	1" EMT / SHAFT S2	2	18 AWG	NO	PLENUM	EMT CONDUIT	10,000	3,095	END OF LOOP
NAC-1	NAC CIRCUIT 1 (CLASS B)	FACP (BASEMENT 2)	HORN / STROBE (ZONE 1)	FPLP	1" EMT / SHAFT S1	2	14 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,450	ZONE 1 DEVICES
NAC-2	NAC CIRCUIT 2 (CLASS B)	FACP (BASEMENT 2)	HORN / STROBE (ZONE 2)	FPLP	1" EMT / SHAFT S2	2	14 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,680	ZONE 2 DEVICES
NAC-3	NAC CIRCUIT 3 (CLASS B)	FACP (BASEMENT 2)	HORN / STROBE (ZONE 3)	FPLP	1" EMT / SHAFT S1	2	14 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,520	ZONE 3 DEVICES
NAC-4	NAC CIRCUIT 4 (CLASS B)	FACP (BASEMENT 2)	HORN / STROBE (ZONE 4)	FPLP	1" EMT / SHAFT S2	2	14 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,710	ZONE 4 DEVICES
NAC-5 (EVAC)	VOICE EVAC CIRCUIT	FACP (BASEMENT 2)	SPEAKER ZONE 1	FPLP	1" EMT / SHAFT S1	2	16 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,900	EVAC ZONE 1
NAC-6 (EVAC)	VOICE EVAC CIRCUIT	FACP (BASEMENT 2)	SPEAKER ZONE 2	FPLP	1" EMT / SHAFT S2	2	16 AWG	NO	PLENUM	EMT CONDUIT	10,000	3,030	EVAC ZONE 2
NAC-7 (EVAC)	VOICE EVAC CIRCUIT	FACP (BASEMENT 2)	SPEAKER ZONE 3	FPLP	1" EMT / SHAFT S1	2	16 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,760	EVAC ZONE 3
NAC-8 (EVAC)	VOICE EVAC CIRCUIT	FACP (BASEMENT 2)	SPEAKER ZONE 4	FPLP	1" EMT / SHAFT S2	2	16 AWG	NO	PLENUM	EMT CONDUIT	10,000	2,930	EVAC ZONE 4
NET-1	FACP NETWORK	FACP (BASEMENT 2)	FACP (FIRE COMMAND CTR)	CAT 6	1" EMT / SHAFT S1	4	23 AWG	YES	PLENUM	EMT CONDUIT	295	185	FIBER OPTIC LINK
NET-2	FACP NETWORK	FACP (BASEMENT 2)	RAP (LOBBY LEVEL)	CAT 6	1" EMT / SHAFT S1	4	23 AWG	YES	PLENUM	EMT CONDUIT	325	210	FIBER OPTIC LINK
BDA-1	BDA AMPLIFIER POWER	FACP (BASEMENT 2)	BDA (ROOFTOP)	THHN / THWN	1" EMT / SHAFT S2	3	12 AWG	NO	RATED	EMT CONDUIT	380	310	120VAC DEDICATED
PWR-FACP	FACP PRIMARY POWER	NORMAL POWER PANEL	FACP (BASEMENT 2)	THHN / THWN	1.5" EMT / ELEC ROOM	3	12 AWG	NO	RATED	EMT CONDUIT	50	42	120VAC DEDICATED
PWR-FACP-BACKUP	FACP BATTERY CIRCUIT	BATTERY CABINET	FACP (BASEMENT 2)	THHN / THWN	1" EMT / ELEC ROOM	2	8 AWG	NO	RATED	EMT CONDUIT	30	22	24VDC BATTERY
GND-1	EQUIPMENT GROUND	FACP (BASEMENT 2)	GROUND BUS BAR	BARE COPPER	1/2" EMT / ELEC ROOM	1	6 AWG	N/A	N/A	EMT CONDUIT	25	20	GREEN INSULATED
VR-1	VOICE ROUTER	FACP (BASEMENT 2)	BMS / BAS INTERFACE	CAT 6	1" EMT / SHAFT S1	4	23 AWG	YES	PLENUM	EMT CONDUIT	320	208	NETWORK LINK
FIRE-COM-1	2-WAY RADIO INTERFACE	FACP (BASEMENT 2)	ERCES SYSTEM	CAT 6	1" EMT / SHAFT S2	4	23 AWG	YES	PLENUM	EMT CONDUIT	340	225	ERCES LINK

CABLE TYPE LEGEND	INSTALLATION METHOD LEGEND	JACKET RATING LEGEND	NOTES	ABBREVIATIONS
FPLR / FPL FIRE POWER LIMITED RISER / PLENUM	EMT CONDUIT ELECTRICAL METALLIC TUBING	PLENUM CMP / FPLP RATED CABLE	1. ALL CABLES ARE PLENUM RATED UNLESS NOTED OTHERWISE. 2. ALL INSTALLATIONS SHALL COMPLY WITH NFPA 72 AND IBC. 3. SUPPORT AND BEND RADIUS SHALL FOLLOW NEC REQUIREMENTS. 4. MAX CABLE LENGTH PER NFPA 72 CLAUSE 18.4.5 APPLIES. 5. AS-BUILT LENGTHS ARE ±5% TOLERANCE.	FACP FIRE ALARM CONTROL PANEL
FPLP FIRE POWER LIMITED PLENUM	RMC CONDUIT RIGID METAL CONDUIT	RATED FIRE RATED CIRCUIT (2 HR)		RAP REMOTE ANNUNCIATOR PANEL
CAT 6 CATEGORY 6 (PLENUM)	FMC FLEXIBLE METAL CONDUIT	GENERAL GENERAL PURPOSE CABLE		NAC NOTIFICATION APPLIANCE CIRCUIT
THHN / THWN THERMOPLASTIC INSULATED WIRE	CABLE TRAY WIRE BASKET / CABLE TRAY	N/A NOT APPLICABLE		SLC SIGNALING LINE CIRCUIT
BARE COPPER BARE COPPER CONDUCTOR	SURFACE SURFACE RACEWAY			ERCES EMERGENCY RESPONDER COMMUNICATIONS ENHANCEMENT SYSTEM
				BDA BI-DIRECTIONAL AMPLIFIER

CABLE COLOR CODE (TYPICAL)	GENERAL NOTES	CONDUIT FILL TABLE (MAX)	SKYLINE TOWER COMPLEX FIRE ALARM & LIFE SAFETY SYSTEM CABLE SCHEDULE (AS-BUILT) NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT	DRAWN BY:	AEG
FIRE ALARM POWER (NAC)	- ALL CABLES SHALL BE LABELED AT BOTH ENDS. - LABELS SHALL INDICATE CABLE TAG AND DESTINATION. - MAINTAIN 18" CLEARANCE FROM HIGH VOLTAGE POWER. - PENETRATIONS SHALL BE FIRESTOPPED PER DETAIL. - CABLE TRAY FILL SHALL NOT EXCEED 40%.	TRADE SIZE		CHECKED BY:	AEG
SIGNALING LINE CIRCUIT (SLC)		ONE CONDUCTOR AREA		APPROVED BY:	AEG
AUDIO / VOICE CIRCUIT		40% FILL ALLOWANCE		SCALE:	N.T.S.
NETWORK / COMMUNICATION				SHEET:	1 OF 1
POWER (AC/DC)					
GROUND					

1. PURPOSE

THE PURPOSE OF THIS FACTORY ACCEPTANCE TEST PLAN (FATP) IS TO VERIFY THAT ALL FIRE ALARM SYSTEM COMPONENTS AND SUBSYSTEMS FUNCTION AS DESIGNED AND MEET THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS, NFPA 72, IFC 510, AND APPLICABLE STANDARDS BEFORE SHIPMENT TO THE SITE.

2. REFERENCES

- NFPA 72 - NATIONAL FIRE ALARM CODE (2022)
- IFC 510 - FIRE ALARM AND DETECTION SYSTEMS
- IBC 907.6.3 - FIRE COMMAND CENTER
- UL 864 - CONTROL UNITS AND ACCESSORIES
- UL 1076 - PROPRIETARY ALARM UNITS
- PROJECT SPECIFICATIONS AND SHOP DRAWINGS

3. TEST OBJECTIVES

- VERIFY OPERATION OF ALL FIRE ALARM FUNCTIONS
- CONFIRM SYSTEM CONFIGURATION AND PROGRAMMING
- VERIFY ALL INPUTS, OUTPUTS, INTERFACES, AND COMMUNICATIONS
- ENSURE AUDIBLE, VISUAL, AND SUPERVISORY SIGNALS OPERATE AS DESIGNED
- VALIDATE CAUSE & EFFECT AND SEQUENCE OF OPERATIONS
- CONFIRM SYSTEM REPORTING AND DATA LOGGING
- DOCUMENT RESULTS AND OBTAIN APPROVAL PRIOR TO SHIPMENT

4. FATP TEST MATRIX

TEST ID	TEST ITEM / DESCRIPTION	TEST METHOD	ACCEPTANCE CRITERIA	RESPONSIBLE PARTY	RESULT (PASS / FAIL)	REMARKS
T-01	FACP POWER-UP & INITIALIZATION	APPLY PRIMARY POWER. VERIFY SYSTEM BOOT AND NORMAL CONDITION.	SYSTEM POWERS UP. NO FAULTS PRESENT.	MANUFACTURER		VERIFY DATE/TIME, SOFTWARE VERSION
T-02	LCD / ANNUNCIATOR DISPLAY	NAVIGATE MENUS AND DISPLAY SCREENS ON FACP AND RAPS.	ALL DISPLAYS FUNCTION. TEXT CLEAR AND CORRECT.	MANUFACTURER		
T-03	VOICE / AUDIBLE SIGNALS	ACTIVATE FIRE ALARM. VERIFY HORN/STROBE AND SPEAKER OUTPUTS.	ALL AUDIBLE/VISUAL DEVICES OPERATE AS PROGRAMMED.	MANUFACTURER		
T-04	SLC DEVICE DETECTION	DISCONNECT AND RECONNECT DEVICES ON SLC LOOPS.	DEVICE ADDRESSES DISPLAY CORRECTLY. NO UNWANTED TROUBLES.	MANUFACTURER		
T-05	MANUAL PULL STATION	ACTIVATE EACH PULL STATION.	ALARM INITIATED AT FACP. CORRECT ZONE / ADDRESS.	MANUFACTURER		
T-06	SMOKE / HEAT DETECTORS	SMOKE / HEAT SIMULATION OR FUNCTIONAL TEST.	ALARM INITIATED AT FACP. CORRECT DEVICE ADDRESS.	MANUFACTURER		
T-07	SUPERVISORY FUNCTIONS	OPEN CIRCUITS (NAC, SLC, AC). VERIFY SUPERVISORY SIGNALS.	SUPERVISORY SIGNALS DISPLAY AND ANNUNCIATE.	MANUFACTURER		
T-08	TROUBLE CONDITIONS	OPEN / SHORT DEVICES AND CIRCUITS.	TROUBLE SIGNALS DISPLAY CORRECTLY.	MANUFACTURER		
T-09	NAC CIRCUIT OPERATION	ACTIVATE ALARM. VERIFY NAC OUTPUTS AND SYNCHRONIZATION.	ALL NAC CIRCUITS OPERATE PER DESIGN.	MANUFACTURER		
T-10	CONTROL OUTPUTS	VERIFY RELAYS / CONTROL MODULES ACTIVATE.	ALL PROGRAMMED OUTPUTS OPERATE CORRECTLY.	MANUFACTURER		
T-11	ELEVATOR RECALL	ACTIVATE FIRE ALARM. VERIFY ELEVATOR RECALL.	ELEVATOR RECALL ACTIVATES ALL DESIGNATED ELEVATORS.	MANUFACTURER		
T-12	HVAC SHUTDOWN	ACTIVATE FIRE ALARM. VERIFY HVAC SHUTDOWN.	AHU SHUTDOWN AND DAMPER CLOSING CONFIRMED.	MANUFACTURER		
T-13	FIRE PUMP START	ACTIVATE FIRE ALARM. VERIFY FIRE PUMP START.	PUMP START SIGNAL CONFIRMED.	MANUFACTURER		
T-14	SMOKE CONTROL / PRESSURIZATION	ACTIVATE FIRE ALARM. VERIFY SMOKE CONTROL / PRESSURIZATION SEQUENCES.	FANS, DAMPERS, AND PRESSURIZATION OPERATE PER SEQUENCE.	MANUFACTURER		
T-15	GAS SHUTDOWN	ACTIVATE FIRE ALARM. VERIFY GAS SHUTDOWN.	GAS SOLENOID CLOSES AND SUPERVISORY CONFIRMED.	MANUFACTURER		
T-16	COMMUNICATIONS	TEST NETWORK, RAPS, BMS, AND REMOTE CONNECTIONS.	ALL DEVICES COMMUNICATE WITHOUT ERRORS.	MANUFACTURER		
T-17	EVENT LOG / HISTORY	GENERATE EVENTS. REVIEW EVENT LOG.	EVENTS TIME-STAMPED AND RECORDED CORRECTLY.	MANUFACTURER		
T-18	BATTERY & CHARGER	VERIFY BATTERY FLOAT VOLTAGE AND CHARGER OPERATION.	BATTERY VOLTAGE WITHIN SPEC. CHARGER NORMAL.	MANUFACTURER		
T-19	SYSTEM RESET	RESET SYSTEM. VERIFY NORMAL STATUS.	SYSTEM RETURNS TO NORMAL CONDITION.	MANUFACTURER		
T-20	DOCUMENTATION REVIEW	VERIFY AS-BUILT PROGRAMMING, POINT LISTS, AND LABELS.	DOCUMENTATION COMPLETE AND ACCURATE.	MANUFACTURER		

5. TEST CONDITIONS

- ALL COMPONENTS SHALL BE INSTALLED IN ACCORDANCE WITH APPROVED SHOP DRAWINGS.
- POWER SUPPLY: 120VAC, 60Hz (PRIMARY) AND BATTERY BACKUP CONNECTED.
- ALL PERIPHERAL DEVICES SHALL BE CONNECTED AND FUNCTIONAL.
- ENVIRONMENTAL CONDITIONS WITHIN MANUFACTURER'S OPERATING RANGE.

6. PARTICIPANTS

MANUFACTURER / SUPPLIER: _____

PROJECT ENGINEER: _____

GENERAL CONTRACTOR: _____

AHJ (IF AVAILABLE): _____

DATE OF TEST: _____

LOCATION OF TEST: _____

7. TEST RESULT SUMMARY

☐ ALL TESTS PASSED

☐ ALL TESTS PASSED WITH MINOR OBSERVATIONS

☐ TESTS PASSED WITH DEFICIENCIES (SEE REMARKS)

☐ TESTS FAILED (SEE REMARKS)

REMARKS / DEFICIENCIES: _____

8. FATP APPROVAL

THE UNDERSIGNED HAVE WITNESSED THE FACTORY ACCEPTANCE TESTING OF THE FIRE ALARM SYSTEM AND CONFIRM THAT THE SYSTEM HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE PLAN. THE SYSTEM IS APPROVED FOR SHIPMENT TO THE PROJECT SITE.

NAME / COMPANY	TITLE	SIGNATURE	DATE
MANUFACTURER / SUPPLIER			
PROJECT ENGINEER			
GENERAL CONTRACTOR			
AHJ (IF AVAILABLE)			

9. DEFICIENCY LOG (IF APPLICABLE)

ITEM ID	DESCRIPTION OF DEFICIENCY	CORRECTIVE ACTION	RESPONSIBLE PARTY	DATE CORRECTED	VERIFIED BY

10. TEST EQUIPMENT

- SMOKE / HEAT SIMULATOR
- MULTIMETER / CLAMP METER
- LOOP TESTER
- NAC CIRCUIT TESTER
- SOUND LEVEL METER
- VOLTAGE TESTER / DMM
- LAPTOP WITH PROGRAMMING SOFTWARE
- RADIO TEST SET (IF APPLICABLE)

ABBREVIATIONS

AHU

Air Handling Unit

NAC

Notification Appliance Circuit

BMS

Building Management System

RAP

Remote Annunciator Panel

FACP

Fire Alarm Control Panel

SLC

Signaling Line Circuit

HVAC

Heating, Ventilation, and Air Conditioning

NOTES

- THIS FATP DOES NOT REPLACE ON-SITE COMMISSIONING TESTING.
- ALL CORRECTED DEFICIENCIES SHALL BE VERIFIED PRIOR TO SHIPMENT.
- REFER TO COMMISSIONING PLAN FOR SITE ACCEPTANCE TESTING.

APPLICABLE CODES & STANDARDS

- NFPA 72 - NATIONAL FIRE ALARM CODE (2022)
- IFC 510 - FIRE ALARM AND DETECTION SYSTEMS
- IBC 907.6.3 - FIRE COMMAND CENTER
- UL 864 / UL 1076 LISTED COMPONENTS

SKYLINE TOWER COMPLEX

FIRE ALARM & LIFE SAFETY SYSTEM

FACTORY ACCEPTANCE TEST PLAN (FATP)

NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

DRAWN BY:

AEG

CHECKED BY:

AEG

APPROVED BY:

AEG

SCALE:

N.T.S.

SHEET:

1 OF 1



SKYLINE TOWER COMPLEX

45-STORY MIXED-USE DEVELOPMENT

COMMISSIONING & FUNCTIONAL TEST WORKFLOW

FIRE ALARM & LIFE SAFETY SYSTEM
NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

DRAWING NUMBER

FA-DRW-026

REV: 0

DATE: 05/15/2024

1. COMMISSIONING PHASES OVERVIEW

THE COMMISSIONING PROCESS IS PERFORMED IN SEQUENTIAL PHASES TO ENSURE ALL FIRE ALARM SYSTEM COMPONENTS ARE PROPERLY INSTALLED, TESTED, VERIFIED, AND APPROVED PRIOR TO TURNOVER.

- PRE-COMMISSIONING
- INSTALLATION VERIFICATION
- SYSTEM FUNCTIONAL TESTING
- INTEGRATED SYSTEM TESTING
- AHJ WITNESS TESTING
- FINAL ACCEPTANCE & TURNOVER

2. GENERAL REQUIREMENTS

- ALL TESTS SHALL BE PERFORMED BY QUALIFIED PERSONNEL.
- TEST EQUIPMENT SHALL BE CALIBRATED AND WITHIN VALID CERTIFICATION.
- ALL DEFICIENCIES SHALL BE DOCUMENTED AND CORRECTED PRIOR TO PROCEEDING.
- ALL TEST RESULTS SHALL BE RECORDED AND SUBMITTED IN FINAL REPORTS.
- AHJ SHALL BE NOTIFIED IN ADVANCE FOR WITNESS TESTING.

6. ROLES & RESPONSIBILITIES

CONTRACTOR

- INSTALLATION & TESTING
- DOCUMENTATION
- DEFICIENCY CORRECTION

COMMISSIONING AGENT

- PERFORM TESTING
- VERIFY PERFORMANCE
- DOCUMENT RESULTS

OWNER REPRESENTATIVE

- REVIEW REPORTS
- APPROVE PROGRESS
- ACCEPT SYSTEM

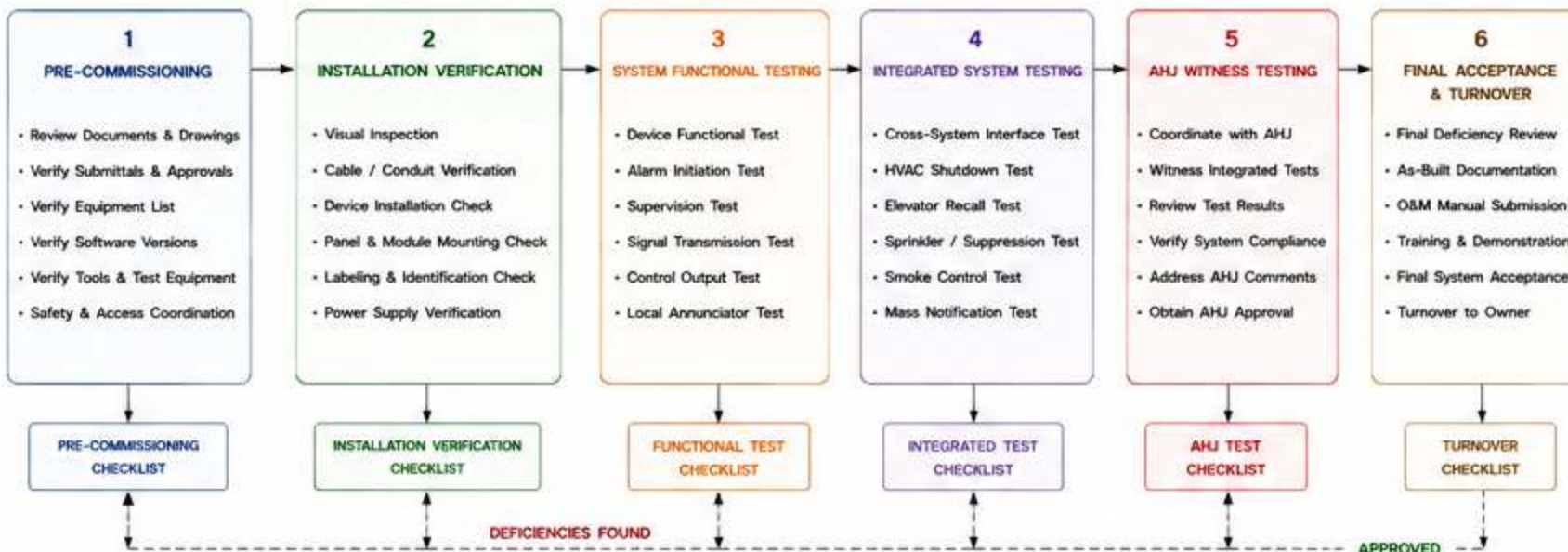
AHJ (IF APPLICABLE)

- REVIEW & WITNESS TESTS
- VERIFY CODE COMPLIANCE
- ISSUE APPROVAL

8. TEST DOCUMENTATION & SUBMITTALS

DOCUMENT	DESCRIPTION
PRE-COMMISSIONING CHECKLIST	Verifies readiness prior to functional testing
FUNCTIONAL TEST RECORDS	Individual device and circuit test results
INTEGRATED TEST REPORTS	Cross-system interface and sequence test results
DEFICIENCY LOG	All issues identified and resolution tracking
TEST EQUIPMENT CALIBRATION RECORDS	Valid calibration certificates for all test equipment
FINAL COMMISSIONING REPORT	Summary of all testing and approvals
O&M MANUALS	Operation and maintenance documentation
AS-BUILT DRAWINGS	Final field verified drawings
TRAINING RECORDS	Owner training attendance and content

3. COMMISSIONING WORKFLOW PROCESS



DEFICIENCY MANAGEMENT PROCESS



7. TYPICAL TEST SEQUENCE



4. SYSTEM FUNCTIONAL TEST CHECKLIST (EXAMPLE)

ITEM	DESCRIPTION	PASS	FAIL	N/A	REMARKS
1	SMOKE DETECTOR TEST				
2	HEAT DETECTOR TEST				
3	MANUAL PULL STATION TEST				
4	WATERFLOW SWITCH TEST				
5	TAMPER SWITCH TEST				
6	ALARM SIGNAL TRANSMISSION				
7	SUPERVISORY SIGNAL TEST				
8	TROUBLE SIGNAL TEST				
9	NAC OUTPUT TEST				
10	STROBE / HORN TEST				
11	ANNUNCIATOR DISPLAY TEST				
12	PRINTER / LOGGING TEST				

5. INTEGRATED SYSTEM TEST MATRIX (EXAMPLE)

INTERFACE	FUNCTION TESTED	METHOD	PASS	FAIL	REMARKS
FACP - HVAC	AHU SHUTDOWN	SIMULATE ALARM			
FACP - ELEVATOR	ELEVATOR RECALL	SIMULATE ALARM			
FACP - SPRINKLER	WATERFLOW ALARM	FLOW SWITCH TEST			
FACP - SMOKE CONTROL	DAMPER / FAN OPERATION	SIMULATE ALARM			
FACP - BMS	ALARM & STATUS POINTS	POINT-TO-POINT TEST			
FACP - MASS NOTIFICATION	VOICE / ALERT MESSAGE	MANUAL ACTIVATE			
FACP - SUPPRESSION	GAS RELEASE SEQUENCE	SIMULATE ALARM			
FACP - FIRE PUMP	PUMP START SIGNAL	SIMULATE ALARM			

10. TURNOVER REQUIREMENTS

- ☐ ALL TESTS COMPLETED AND PASSED
- ☐ ALL DEFICIENCIES RESOLVED
- ☐ AHJ APPROVAL OBTAINED
- ☐ O&M MANUALS SUBMITTED
- ☐ AS-BUILT DRAWINGS SUBMITTED
- ☐ TRAINING COMPLETED
- ☐ FINAL SYSTEM ACCEPTANCE SIGNED

ABBREVIATIONS

AHJ	Authority Having Jurisdiction	RAP	Remote Annunciator Panel
BMS	Building Management System	SLC	Signaling Line Circuit
CxA	Commissioning Agent	BDA	Bi-Directional Amplifier
FACP	Fire Alarm Control Panel	IBRES	In-Building Radio Enhancement System
HVAC	Heating, Ventilation, and Air Conditioning	EOL	End of Line
NAC	Notification Appliance Circuit		

APPLICABLE CODES & STANDARDS

- NFPA 72 - NATIONAL FIRE ALARM CODE (2022)
- IFC 510 - FIRE ALARM AND DETECTION SYSTEMS
- IBC 907.6.3 - FIRE COMMAND CENTER
- UL 864 - CONTROL UNITS AND ACCESSORIES
- UL 1076 - PROPRIETARY ALARM UNITS
- NFPA 3 - COMMISSIONING OF FIRE PROTECTION SYSTEMS

NOTES

- ALL TESTING SHALL BE PERFORMED IN A SAFE MANNER.
- COORDINATE ALL TESTING WITH BUILDING OPERATIONS.
- PROVIDE MINIMUM 48 HOURS NOTICE TO AHJ.
- ALL RECORDS SHALL BE CLEAR AND LEGIBLE.
- DO NOT PROCEED WITHOUT CORRECTING DEFICIENCIES.

SKYLINE TOWER COMPLEX
FIRE ALARM & LIFE SAFETY SYSTEM
COMMISSIONING & FUNCTIONAL TEST WORKFLOW
NFPA 72 / IFC 510 / IBC 907.6.3 COMPLIANT

DRAWN BY:	AEG
CHECKED BY:	AEG
APPROVED BY:	AEG
SCALE:	N.T.S.
SHEET:	1 OF 1