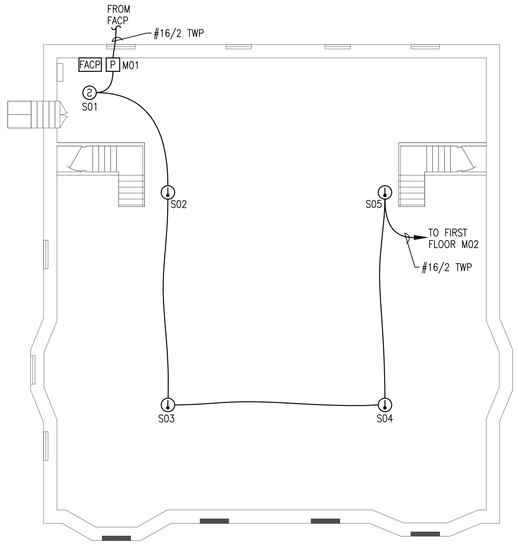

BASEMENT
FIRE ALARM PLAN

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

0 4' 8' 16'

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Security Systems
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Office: 207.846.3350 • Fax: 207.846.6080

500 WASHINGTON AVE
PORTLAND, ME 04103
FIRE ALARM PLAN

NICET IV
Fire Alarm Systems
Wayne B. Haws / Signature
Date: 2/15/18
Fire Protection Engineering Technology
Fire Alarm Systems
Cert. No. 90496
Exp 5/1/2020

shop drawings
created by:
5794 W. 4600 So.
Hooper, UT 84315
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SCALE	1/8"=1'-0"

FA-1

FIRST FLOOR
FIRE ALARM PLAN

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

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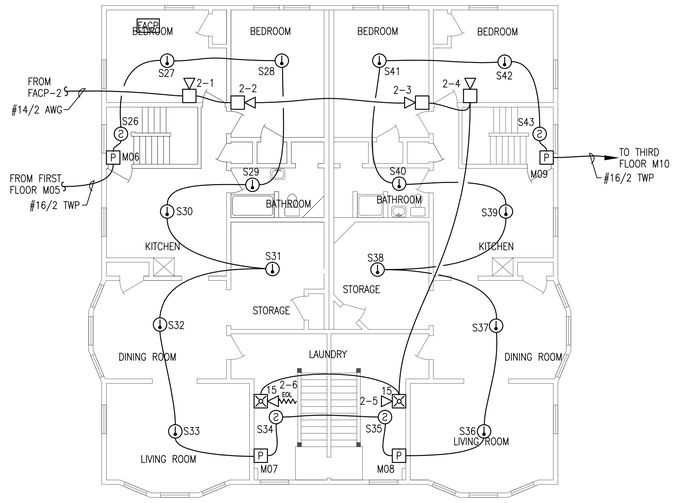

SECOND FLOOR FIRE ALARM PLAN

N

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

0 4' 8' 16'

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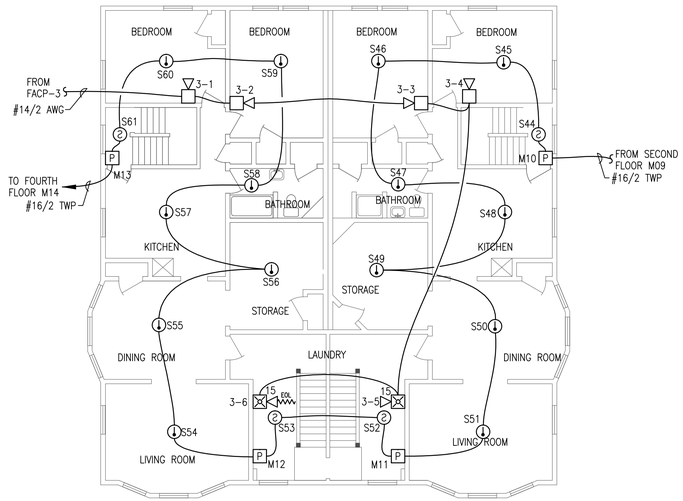
SCALE	1/8"=1'-0"

FA-3



THIRD FLOOR
FIRE ALARM PLAN

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

0 4' 8' 16'

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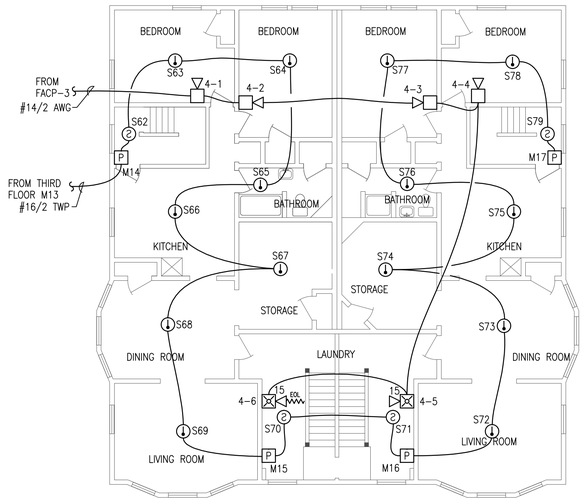
SCALE	1/8"=1'-0"

FA-4



FOURTH FLOOR
FIRE ALARM PLAN

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

0 4' 8' 16'

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FOURTH FLOOR FIRE ALARM PLAN

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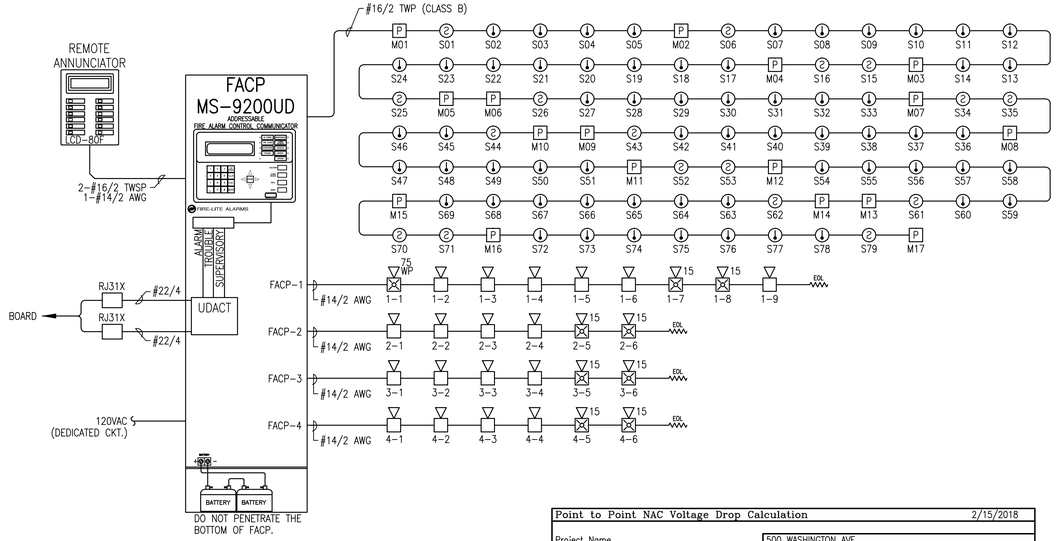


FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE

FACP Battery Calculation

2/15/2018

PROJECT NAME: 500 WASHINGTON AVE
Required Standby Time: 24 Hours
Required Alarm Time: 5 Minutes

AC Branch Current

AC Branch Current: Amps @ 120V

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP MAINBOARD	1	X	0.14500	=	0.14500
SMOKE DETECTOR	17	X	0.00030	=	0.00510
HEAT DETECTOR	62	X	0.00030	=	0.01860
PULL STATION	17	X	0.00030	=	0.00510
ANNUNCIATOR	1	X	0.01500	=	0.01500
TOTAL STANDBY LOAD					0.18880

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP MAINBOARD	1	X	0.27500	=	0.27500
MAX ALARM ADDRESSABLE SLC	1	X	0.40000	=	0.40000
ANNUNCIATOR	1	X	0.04000	=	0.04000
FACP-1 (See Voltage Drop Calculations)	1	X	0.38600	=	0.38600
FACP-2 (See Voltage Drop Calculations)	1	X	0.17600	=	0.17600
FACP-3 (See Voltage Drop Calculations)	1	X	0.17600	=	0.17600
FACP-4 (See Voltage Drop Calculations)	1	X	0.17600	=	0.17600
TOTAL ALARM LOAD					1.62900

Battery Requirements

Standby Load			Required Standby Time in Hours	
Current (Amps)	0.18880	X	24.00000	= 4.53120
Alarm Load			Required Alarm Time in Hours	
Current (Amps)	1.62900	X	0.08333	= 0.13575
Total Ampere Hours (before derating factor)				4.66695
Derating Factor			X	1.2
TOTAL AMPERE HOURS REQUIRED			=	5.60034
BATTERIES TO BE PROVIDED (2 – 12v)				7 AH

Point to Point NAC Voltage Drop Calculation

2/15/2018

Project Name: 500 WASHINGTON AVE
Circuit Number: FACP-1

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16.0 volts
Distance from source to 1st device: 50 feet
Wire Gauge for balance of circuit: Wire Gauge 14 / 14; Resistance Per 1000 3.07 / 3.07

Max Output Current: 3.00 amps
Total Circuit Current: 0.386 amps
End of Line Voltage: 20.13 volts

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.176	50	20.28	0.119	0.58%
Device 2	0.017	25	20.25	0.151	0.74%
Device 3	0.017	15	20.23	0.169	0.83%
Device 4	0.017	25	20.20	0.196	0.96%
Device 5	0.017	15	20.19	0.210	1.03%
Device 6	0.017	40	20.15	0.245	1.20%
Device 7	0.054	20	20.14	0.260	1.28%
Device 8	0.054	20	20.13	0.269	1.32%
Device 9	0.017	20	20.13	0.271	1.33%
Totals	0..386	230			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).

Point to Point NAC Voltage Drop Calculation

2/15/2018

Project Name: 500 WASHINGTON AVE
Circuit Number: FACP-2

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16.0 volts
Distance from source to 1st device: 55 feet
Wire Gauge for balance of circuit: Wire Gauge 14 / 14; Resistance Per 1000 3.07 / 3.07

Max Output Current: 3.00 amps
Total Circuit Current: 0.176 amps
End of Line Voltage: 20.25 volts

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.017	55	20.34	0.059	0.29%
Device 2	0.017	15	20.33	0.074	0.36%
Device 3	0.017	25	20.30	0.096	0.47%
Device 4	0.017	15	20.29	0.107	0.53%
Device 5	0.054	45	20.26	0.137	0.67%
Device 6	0.054	25	20.25	0.146	0.71%
Totals	0.176	180			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).

Point to Point NAC Voltage Drop Calculation

2/15/2018

Project Name: 500 WASHINGTON AVE
Circuit Number: FACP-3

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16.0 volts
Distance from source to 1st device: 70 feet
Wire Gauge for balance of circuit: Wire Gauge 14 / 14; Resistance Per 1000 3.07 / 3.07

Max Output Current: 3.00 amps
Total Circuit Current: 0.176 amps
End of Line Voltage: 20.24 volts

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.017	70	20.32	0.076	0.37%
Device 2	0.017	15	20.31	0.090	0.44%
Device 3	0.017	25	20.29	0.112	0.55%
Device 4	0.017	15	20.28	0.124	0.61%
Device 5	0.054	45	20.25	0.153	0.75%
Device 6	0.054	25	20.24	0.162	0.79%
Totals	0.176	195			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).

Point to Point NAC Voltage Drop Calculation

2/15/2018

Project Name: 500 WASHINGTON AVE
Circuit Number: FACP-4

Nominal System Voltage: 20.4 volts
Minimum Device Voltage: 16.0 volts
Distance from source to 1st device: 85 feet
Wire Gauge for balance of circuit: Wire Gauge 14 / 14; Resistance Per 1000 3.07 / 3.07

Max Output Current: 3.00 amps
Total Circuit Current: 0.176 amps
End of Line Voltage: 20.22 volts

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.017	85	20.31	0.092	0.45%
Device 2	0.017	15	20.29	0.106	0.52%
Device 3	0.017	25	20.27	0.128	0.63%
Device 4	0.017	15	20.26	0.140	0.69%
Device 5	0.054	45	20.23	0.170	0.83%
Device 6	0.054	25	20.22	0.178	0.87%
Totals	0.176	210			

Notes:
Wire resistance is doubled in the calculations for two wires (Positive and Negative).
The voltage calculated to the last device must not be lower than the manufactures listed minimum operating voltage (IE: rated operating voltage 16–33 VDC (24 VDC nominal)).

FIRE ALARM SYMBOL LEGEND

NOTE: ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT

SYMBOL	DESCRIPTION	MOUNTING
FACP	FIRE ALARM CONTROL PANEL	WALL–TOP @ 66"
FSA	FIRE SYSTEM ANNUNCIATOR	WALL–TOP @ 66"
(S)	SMOKE DETECTOR	CEILING
(H)	HEAT DETECTOR	CEILING
CM	ADDRESSABLE CONTROL MODULE	FIELD VERIFY
P	MANUAL PULL STATION	WALL @ 48"
	MINI HORN	WALL @ 10'–0
WP	WEATHER PROOF HORN / STROBE	WALL 80"–96"
	HORN / STROBE	WALL 80"–96"

ABBREVIATION	DESCRIPTION
E	EXISTING
G	WITH GUARD
P	PENDANT MOUNT
R	RESIDENTIAL (110V)
S	SOUNDER BASE
WP	WEATHER PROOF
EOL	END OF LINE RESISTOR
EOLR	END OF LINE RELAY
AWG	AMERICAN WIRE GAUGE
TWP	TWISTED PAIR
TWSP	TWISTED SHIELDED PAIR
FPLP	FIRE POWER LIMITED PLENUM
FPLR	FIRE POWER LIMITED RISER
NAC	NOTIFICATION APPLIANCE CIRCUIT
SLC	SIGNALING LINE CIRCUIT

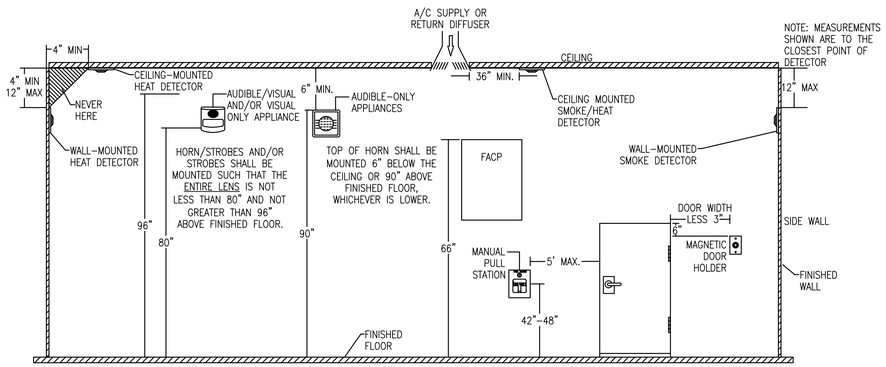
SPEAKER WATTAGE (W) 75 STROBE CANDELA 30

(S) DEVICE ADDRESS (H)
L1D001 OR D01
(L – DENOTES LOOP #)
(D or M – DENOTES DETECTOR OR MODULE #)

1–#16/2 TWP
WIRE TYPE ABBREVIATED
CONDUCTOR COUNT
WIRE SIZE
OF CABLES (IF OMITTED ONLY 1 CABLE NEEDED)

OPERATIONS MATRIX

FIRE ALARM INPUT	FIRE ALARM OUTPUT: ACTIVATE ALARM INDICATOR	ACTIVATE AUDIBLE ALARM	ACTIVATE TROUBLE INDICATOR	ACTIVATE AUDIBLE TROUBLE INDICATOR	TRANSMIT ALARM SIGNAL	TRANSMIT TROUBLE SIGNAL	ACTIVATE NOTIFICATION APPLIANCES
SMOKE DETECTORS (SPOT OR BEAM)	●	●			●		●
HEAT DETECTORS	●	●			●		●
PULL STATIONS	●	●			●		●
FIRE ALARM AC POWER FAIL			●	●		●	
FIRE ALARM LOW BATTERY			●	●		●	
OPEN CIRCUIT			●	●		●	
GROUND FAULT			●	●		●	
NAC SHORT CIRCUIT			●	●		●	
LOSS OF AC TO BUILDING			●	●		●	



FIRE ALARM DEVICE MOUNTING HEIGHTS

SCALE: NOT TO SCALE

GENERAL NOTES:

1. SCOPE OF WORK: THIS PROJECT SHALL INCLUDE THE INSTALLATION OF A NEW ADDRESSABLE FIRE ALARM SYSTEM WITH FULL OCCUPANT NOFICATION THROUGH OUT THE BUILDING.
2. THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
3. INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
4. WIRING DEPICTED ON THESE PLANS IS SCHEMATIC – ACTUAL WIRE LOCATIONS MAY DIFFER FROM THESE PLANS. WIRING SHALL BE PERFORMED AS ACTUAL BUILDING CONSTRUCTION CONDITIONS ALLOW AND TO MINIMIZE PENETRATIONS THROUGH AREA SEPARATION WALLS AND FIRE WALLS. THE USE OF A RACEWAY IS PERMITTED AS LONG AS NO 110V OR HIGHER VOLTAGE CABLES ARE IN THE SAME RACEWAY.
5. FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE–RATED CONSTRUCTION.
6. POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT. THE LOCATION OF THE BRANCH CIRCUIT BREAKER SHALL BE PERMANENTLY IDENTIFIED AT THE CONTROL UNIT AND SHALL HAVE A RED MARKING IN ACCORDANCE WITH NFPA 72.
7. POWER–LIMITED AND NONPOWER–LIMITED CIRCUIT WIRING MUST REMAIN SEPARATED IN CABINET. ALL POWER–LIMITED CIRCUIT WIRING MUST REMAIN AT LEAST 0.25" AWAY FROM ANY NONPOWER–LIMITED CIRCUIT WIRING. FURTHERMORE, ALL POWER–LIMITED AND NONPOWER–LIMITED CIRCUIT WIRING MUST ENTER AND EXIT THE CABINET THROUGH DIFFERENT KNOCK OUTS AND/OR SEPARATE CONDUITS.
8. WHEN UTILIZING CLASS "A" CIRCUITS, SEPARATE OUTGOING AND RETURN CONDUCTORS OF CLASS "A" CIRCUITS BY A MINIMUM OF 12" WHERE RUN VERTICALLY AND 48" WHERE RUN HORIZONTALLY.
9. WHEN UTILIZING SHIELDED CABLE TIE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX. INSULATE AND TAPE BACK AT END.
10. ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
11. SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN–UP IS COMPLETED AND FINAL.
12. LOCATE SMOKE DETECTORS A MINIMUM OF THREE (3) FEET FROM MECHANICAL DIFFUSERS. WALL–MOUNTED SMOKE DETECTORS SHALL BE LOCATED A MINIMUM OF 4" AND A MAXIMUM OF 12" FROM CEILING. CEILING–MOUNTED SMOKE DETECTORS SHALL BE MOUNTED ON CEILINGS AND NOT ON THE BOTTOMS OF BEAMS OR JOISTS.
13. PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL REQUIRED SYNC MODULES. PROVIDE A MULTI–SYNC MODE SLAVE CONNECTION BETWEEN ALL SYNC MODULES.
14. VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
15. UPON COMPLETION OF THE FIRE ALARM SYSTEM INSTALLATION AND PROGRAMMING, THE INSTALLING CONTRACTOR SHALL PERFORM FINAL TESTING OF THE ENTIRE SYSTEM, PER ALL APPLICABLE CODES, AND SHALL COORDINATE AND PERFORM A FINAL FIRE ALARM SYSTEM INSPECTION.
16. PROVIDE OFF–SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.6.5 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
17. INSTALLING CONTRACTOR SHALL, PHYSICALLY, LABEL ALL INITIATING DEVICES AND NOTIFICATION APPLIANCE CIRCUIT END OF LINE (WHEN WIRING CLASS "B"). THESE LABELS SHALL BE IN PLACE PRIOR TO START–UP AND TESTING.

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NOTES, DETAILS, RISER DIAGRAM & CALCS

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