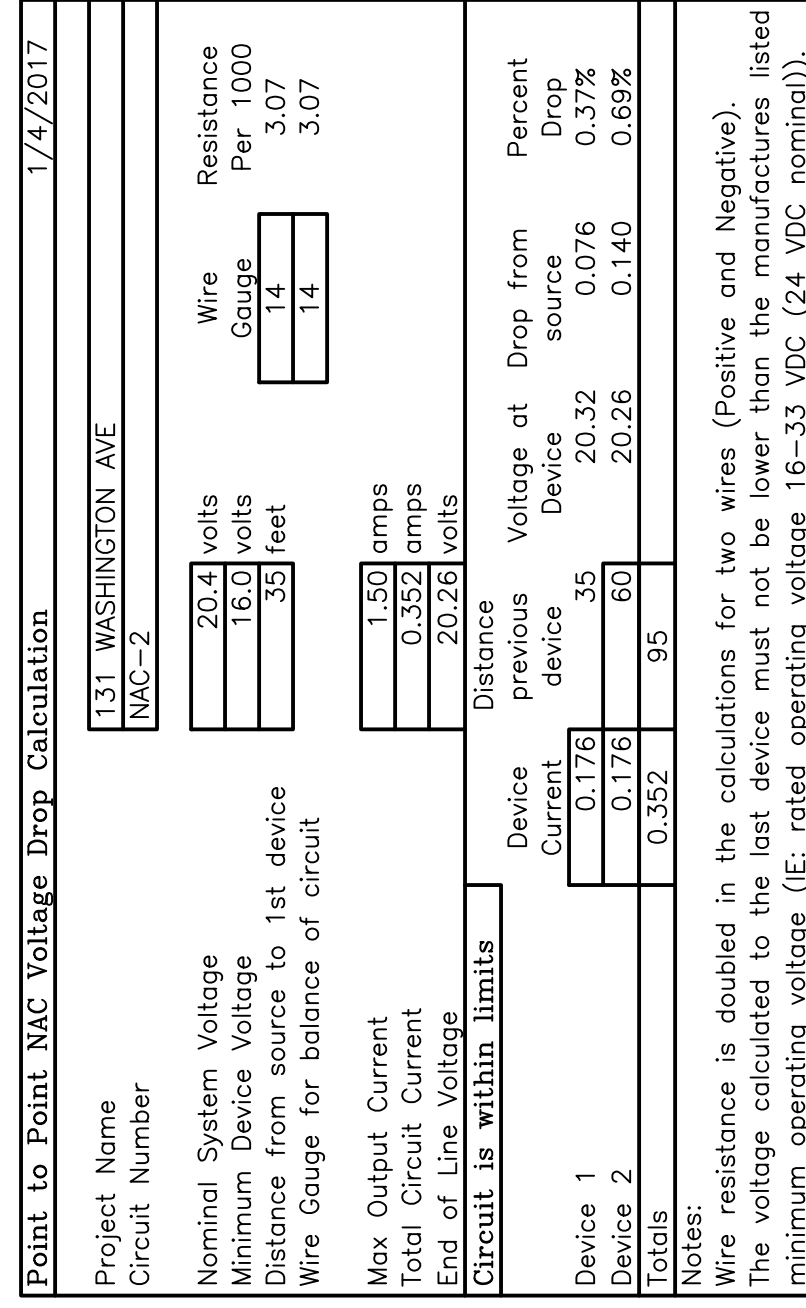
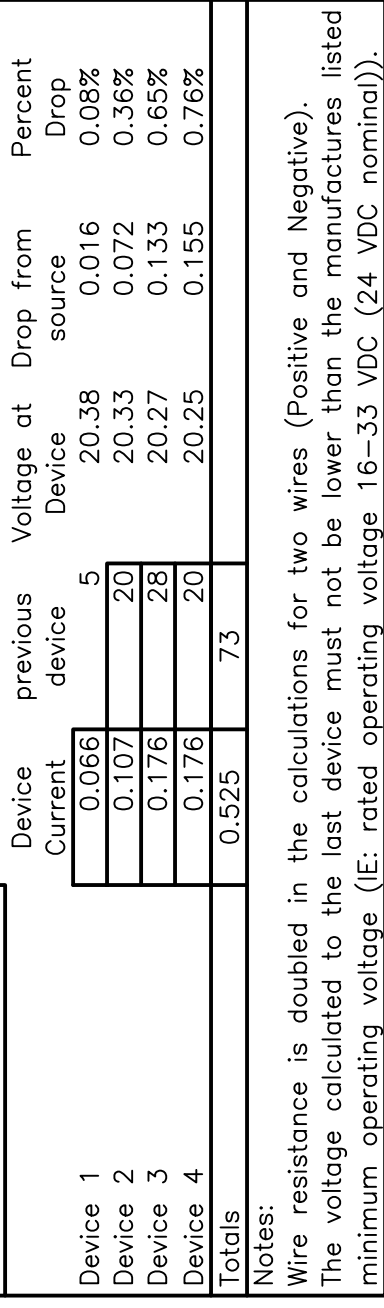


FACP Battery Calculation			1/4/2017
PROJECT NAME:	131 WASHINGTON AVE		
Required Standby Time:	24 Hours		
Required Alarm Time:	5 Minutes		
Regulated Load in Standby			Total Current (Amps)
Device Type	Number of Devices	Current (Amps)	
FACP - MS9050UD MAIN CIRCUIT BOARD	1	0.12000	= 0.12000
REMOTE ANNUNCIATOR - ANN-80	1	0.01500	= 0.01500
SMOKE DETECTOR - SD355	1	0.00030	= 0.00030
HEAT DETECTOR - H355	1	0.00030	= 0.00030
PULL STATION - BG-12LX	1	0.00023	= 0.00023
TOTAL STANDBY LOAD			0.15883
Regulated Load in ALARM			Total Current (Amps)
Device Type	Number of Devices	Current (Amps)	
FACP - MS9050UD MAIN CIRCUIT BOARD	1	0.20000	= 0.20000
REMOTE ANNUNCIATOR - ANN-80	1	0.04000	= 0.04000
MAX ALARM DRAW - ALL ADDRESS DEVICES	1	0.40000	= 0.40000
NAC-1 (See Voltage Drop Calculations)	1	0.55000	= 0.55000
NAC-2 (See Voltage Drop Calculations)	1	0.35200	= 0.35200
TOTAL ALARM LOAD			1.51700
Battery Requirements			Required Standby Time in Hours
Standby Load (Amps)	0.15883	X	24.00000
Current (Amps)	1.51700	X	0.08333
Total Amperes Hours (before derating factor)			3.38634
Derating Factor			X
BATTERIES TO BE PROVIDED (2 - 12V)			4.06350
			7 AH

Point to Point NAC Voltage Drop Calculation			1/4/2017
Project Name	131 WASHINGTON AVE		
Circuit Number	NAC-1		
Nominal System Voltage	20.4 volts	Wire Gauge	14
Minimum Device Voltage	16.0 volts	Resistance Per 1000 Feet	3.07
Distance from source to 1st device	5 feet		
Wire Gauge for balance of circuit	14		
Max Output Current	1.50 amps		
Total Circuit Current	0.525 amps		
End of Line Voltage	20.25 volts		
Circuit is within limits			Percent Drop
Device 1	0.086	Device Voltage at source	20.38
Device 2	0.107	Device Voltage at source	20.33
Device 3	0.176	Device Voltage at source	20.27
Device 4	0.176	Device Voltage at source	20.25
Totals	0.525	73	
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 manufacturers listed minimum operating voltage (E: rated operating voltage 16-33 VDC (24 VDC nominal)).			

Point to Point NAC Voltage Drop Calculation			1/4/2017
Project Name	131 WASHINGTON AVE		
Circuit Number	NAC-2		
Nominal System Voltage	20.4 volts	Wire Gauge	14
Minimum Device Voltage	16.0 volts	Resistance Per 1000 Feet	3.07
Distance from source to 1st device	35 feet		
Wire Gauge for balance of circuit	14		
Max Output Current	1.50 amps		
Total Circuit Current	0.352 amps		
End of Line Voltage	20.26 volts		
Circuit is within limits			Percent Drop
Device 1	0.176	Device Voltage at source	20.32
Device 2	0.176	Device Voltage at source	20.26
Totals	0.352	95	
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 manufacturers listed minimum operating voltage (E: rated operating voltage 16-33 VDC (24 VDC nominal)).			



**GENERAL NOTES:**

- THESE DRAWINGS ARE DIAGRAMMATIC. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
- INSTALLATION SHALL COMPLY WITH NEC, NFPA 72 AND ALL OTHER APPLICABLE CODES AS REQUIRED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
- WIRING DEPICED 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.
- FIRE RATINGS SHALL BE MAINTAINED FOR ALL PENETRATIONS THROUGH FIRE-RATED CONSTRUCTION.
- POWER FOR ALL FIRE ALARM PANELS AND FIRE ALARM POWER SUPPLIES MUST BE PROVIDED BY A DEDICATED AC BRANCH CIRCUIT.
- 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.
- 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.
- WHEN UTILIZING SHIELDED CABLE, TIE SHIELDS THROUGH AND INSULATE AT EACH JUNCTION BOX. INSULATE AND TAPE BACK AT END.
- ALL FIRE ALARM CABLING SHALL BE ACCEPTABLE TO THE FIRE ALARM EQUIPMENT MANUFACTURER FOR THE INTENDED PURPOSE.
- SMOKE DETECTORS SHALL NOT BE INSTALLED UNTIL AFTER CONSTRUCTION CLEAN-UP IS COMPLETED AND FINAL.
- 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.
- PROVIDE SYNCHRONIZATION OF ALL VISUAL NOTIFICATION APPLIANCE CIRCUITS. PROVIDE ALL REQUIRED SYNC MODULES. PROVIDE A MULTI-SYNC MODE SLAVE CONNECTION BETWEEN ALL SYNC MODULES.
- VERIFY ALL FIELD SELECTABLE AUDIBILITY SETTINGS OF NOTIFICATION APPLIANCES WITH FIRE ALARM CONTRACTOR.
- 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.
- PROVIDE OFF-SITE MONITORING AS REQUIRED BY THE INTERNATIONAL FIRE CODE, SECTION 907.15 AND THE LOCAL AUTHORITY HAVING JURISDICTION.
- 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.

**FIRE ALARM SYMBOL LEGEND**  
NOTE: ALL SYMBOLS MUST BE USED ON THIS PROJECT

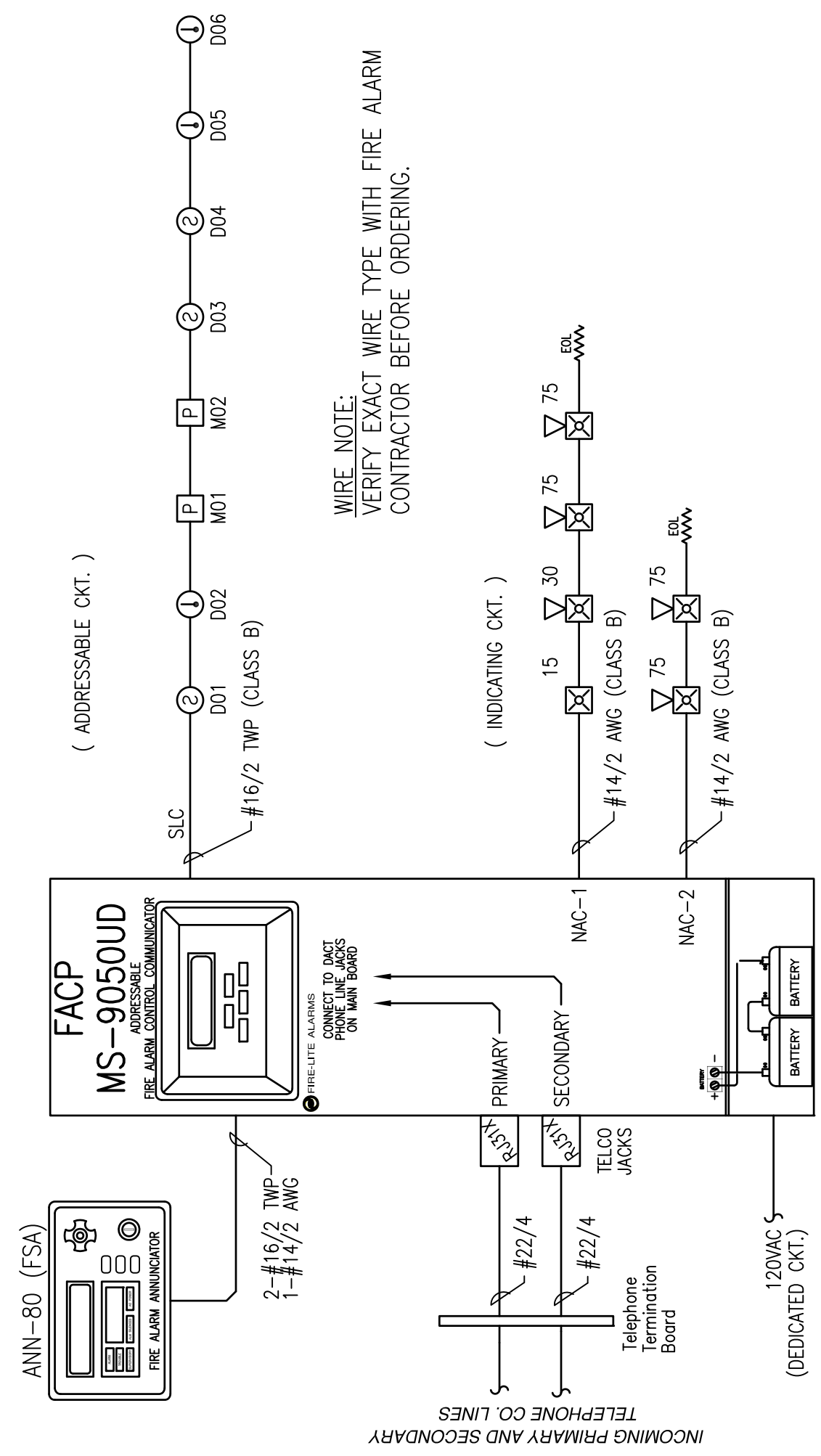
SYMBOL	DESCRIPTION	MOUNTING
FACP	FIRE ALARM CONTROL PANEL	WALL-TOP @ 66"
FPS	FIRE ALARM POWER SUPPLY	FIELD VERIFY
FSA	FIRE SYSTEM ANNUNCIATOR	WALL-TOP @ 66"
FSD	FIRE/SMOKE DAMPER	BY OTHERS
SD	SMOKE DETECTOR	CEILING
SD-	DUCT SMOKE DETECTOR	BY OTHERS
SD	HEAT DETECTOR	CEILING
AM	ADDRESSABLE CONTROL MODULE	FIELD VERIFY
MM	ADDRESSABLE MONITOR MODULE	FIELD VERIFY
P	MANUAL PULL STATION	WALL @ 48"
LR	CONTROL RELAY (MULTI-VOLTAGE)	FIELD VERIFY
RM	ADDRESSABLE RELAY MODULE	FIELD VERIFY
SD	MAGNETIC DOOR HOLDER	FIELD VERIFY
BELL	BELL	FIELD VERIFY
CM	CEILING MOUNT STROBE	FIELD VERIFY
CH	CEILING MOUNT HORN / STROBE	FIELD VERIFY
CS	CEILING MOUNT SPEAKER / STROBE	FIELD VERIFY
HORN	HORN / STROBE	WALL @ 10'-0"
SPK	SPEAKER / STROBE	WALL 80"-96"
SP	SPEAKER	WALL @ 90"
STROBE	STROBE	WALL 80"-96"
ABBREVIATION	DESCRIPTION	
E	EXISTING	
G	WITH GUARD	
P	PENDENT MOUNT	
R	RESIDENTIAL (110V)	
S	SCOURER BASE	
WP	WEATHER PROOF	
EOL	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	

**APPLICABLE CODES:**

MAINE UNIFORM ENERGY & BUILDING CODE  
 PORTLAND CITY CODE, CHAPTER 10, FIRE PREVENTION & PROTECTION  
 NFPA 1, FIRE CODE, & NFPA 101, LIFE SAFETY CODE

**OPERATIONS MATRIX**

	FIRE ALARM OUTPUT	ACTIVATE ALARM INDICATOR	ACTIVATE AUDIBLE ALARM	ACTIVATE TROUBLE INDICATOR	ACTIVATE TROUBLE INDICATOR	TRANSMIT TROUBLE SIGNAL	TRANSMIT TROUBLE SIGNAL	ACTIVATE NOTIFICATION APPLIANCES
FIRE ALARM INPUT								
SMOKE DETECTORS								
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 RISER DIAGRAM**

SCHEMATIC: NO SCALE

**CUNNINGHAM**

**Security Systems**

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CALCS, DETAILS, LEGEND, MATRIX, NOTES

DRAWN	JPB UNICAD JOB #16977
CHECKED	WAYNE B. HANS NICT # 90496
DATE	1/5/2017
REVISION	0
SCALE	NONE

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**FA-1**