FOURTH FLOOR FIRE ALARM PLAN

SCALE: 1/4"=1'-0"
FIELD VERIFY DIMENSIONS

0 2' 4' 8'

FACP Battery Calculation

9/13/2017

PROJECT NAME:	30–32 STATE STREET	
Required Standby Time:	24	Hours
Required Alarm Time:	5	Minutes

Regulated Load in Standby

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP – MS–9200UDLS MAIN CIRCUIT BOARD	1	X	0.14500	=	0.14500
LCD–80 REMOTE ANNUNCIATOR	2	X	0.02500	=	0.05000
SD355 SMOKE DETECTOR	11	X	0.00030	=	0.00330
H355/H355R HEAT DETECTOR	54	X	0.00030	=	0.01620
MMF–301 MINI MONITOR MODULE	21	X	0.00038	=	0.00788
TOTAL STANDBY LOAD					0.22238

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP – MS–9200UDLS MAIN CIRCUIT BOARD	1	X	0.27500	=	0.27500
LCD–80 REMOTE ANNUNCIATOR	2	X	0.06400	=	0.12800
MAX ALARM DRAW – ALL ADDRESS DEVICES	1	X	0.40000	=	0.40000
NAC–1 (See Voltage Drop Calculations)	1	X	0.41100	=	0.41100
NAC–2 (See Voltage Drop Calculations)	1	X	0.60200	=	0.60200
NAC–3 (See Voltage Drop Calculations)	1	X	0.31800	=	0.31800
NAC–4 (See Voltage Drop Calculations)	1	X	0.28400	=	0.28400
TOTAL ALARM LOAD					2.41800

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.22238	X	24.00000	=	5.33700
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	2.41800	X	0.08333	=	0.20150
Total Ampere Hours (before derating factor)					5.53850
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	6.64620
BATTERIES TO BE PROVIDED (2 – 12v)					7 AH

Point to Point NAC Voltage Drop Calculation

9/13/2017

Project Name	30–32 STATE STREET			
Circuit Number	NAC–1			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	30	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.411	amps		
End of Line Voltage	19.96	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.054	30	20.28	0.121	0.59%
Device 2	0.074	20	20.21	0.190	0.93%
Device 3	0.121	40	20.10	0.301	1.48%
Device 4	0.162	90	19.96	0.444	2.18%
Totals	0.411	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

9/13/2017

Project Name	30–32 STATE STREET			
Circuit Number	NAC–2			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	50	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.602	amps		
End of Line Voltage	18.81	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.054	50	20.11	0.294	1.44%
Device 2	0.017	25	19.97	0.428	2.10%
Device 3	0.017	35	19.79	0.610	2.99%
Device 4	0.054	15	19.71	0.686	3.36%
Device 5	0.054	25	19.60	0.798	3.91%
Device 6	0.017	15	19.54	0.858	4.20%
Device 7	0.017	35	19.41	0.991	4.86%
Device 8	0.054	25	19.32	1.082	5.30%
Device 9	0.054	40	19.19	1.206	5.91%
Device 10	0.017	25	19.13	1.271	6.23%
Device 11	0.017	25	19.07	1.331	6.52%
Device 12	0.017	30	19.00	1.398	6.86%
Device 13	0.054	35	18.93	1.471	7.21%
Device 14	0.054	20	18.90	1.503	7.37%
Device 15	0.017	35	18.86	1.538	7.54%
Device 16	0.017	30	18.84	1.564	7.67%
Device 17	0.017	25	18.82	1.582	7.75%
Device 18	0.054	25	18.81	1.595	7.82%
Totals	0.602	515			

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

9/13/2017

Project Name	30–32 STATE STREET			
Circuit Number	NAC–3			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	70	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.318	amps		
End of Line Voltage	19.79	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.054	70	20.18	0.218	1.07%
Device 2	0.017	25	20.12	0.282	1.38%
Device 3	0.017	25	20.06	0.343	1.68%
Device 4	0.017	30	19.99	0.410	2.01%
Device 5	0.054	35	19.92	0.483	2.37%
Device 6	0.054	20	19.89	0.514	2.52%
Device 7	0.017	35	19.85	0.550	2.70%
Device 8	0.017	30	19.82	0.576	2.82%
Device 9	0.017	25	19.81	0.593	2.91%
Device 10	0.054	25	19.79	0.606	2.97%
Totals	0.318	320			

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

9/13/2017

Project Name	30–32 STATE STREET			
Circuit Number	NAC–4			
Nominal System Voltage	20.4	volts	Wire	Resistance
Minimum Device Voltage	16.0	volts	Gauge	Per 1000
Distance from source to 1st device	80	feet	16	4.89
Wire Gauge for balance of circuit			16	4.89
Max Output Current	1.50	amps		
Total Circuit Current	0.284	amps		
End of Line Voltage	19.95	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.054	80	20.18	0.222	1.09%
Device 2	0.017	20	20.13	0.267	1.31%
Device 3	0.017	35	20.06	0.340	1.67%
Device 4	0.054	15	20.03	0.369	1.81%
Device 5	0.054	25	20.00	0.404	1.98%
Device 6	0.017	15	19.98	0.416	2.04%
Device 7	0.017	35	19.96	0.441	2.16%
Device 8	0.054	20	19.95	0.451	2.21%
Totals	0.284	245			

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)).

RESERVED FOR CITY STAMP

Reviewed for Code Compliance Inspections Division Approved as Noted
Date: 10/03/17

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	9/14/2017

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30-32 STATE STREET
PORTLAND, MAINE
FOURTH FLOOR FIRE ALARM PLAN

DRAWN	JPB UNICAD JOB #17617
CHECKED	BRADY B. HAWS NICET III 138751
DATE	9/14/2017
REVISION	0
SCALE	1/4"=1'-0"

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