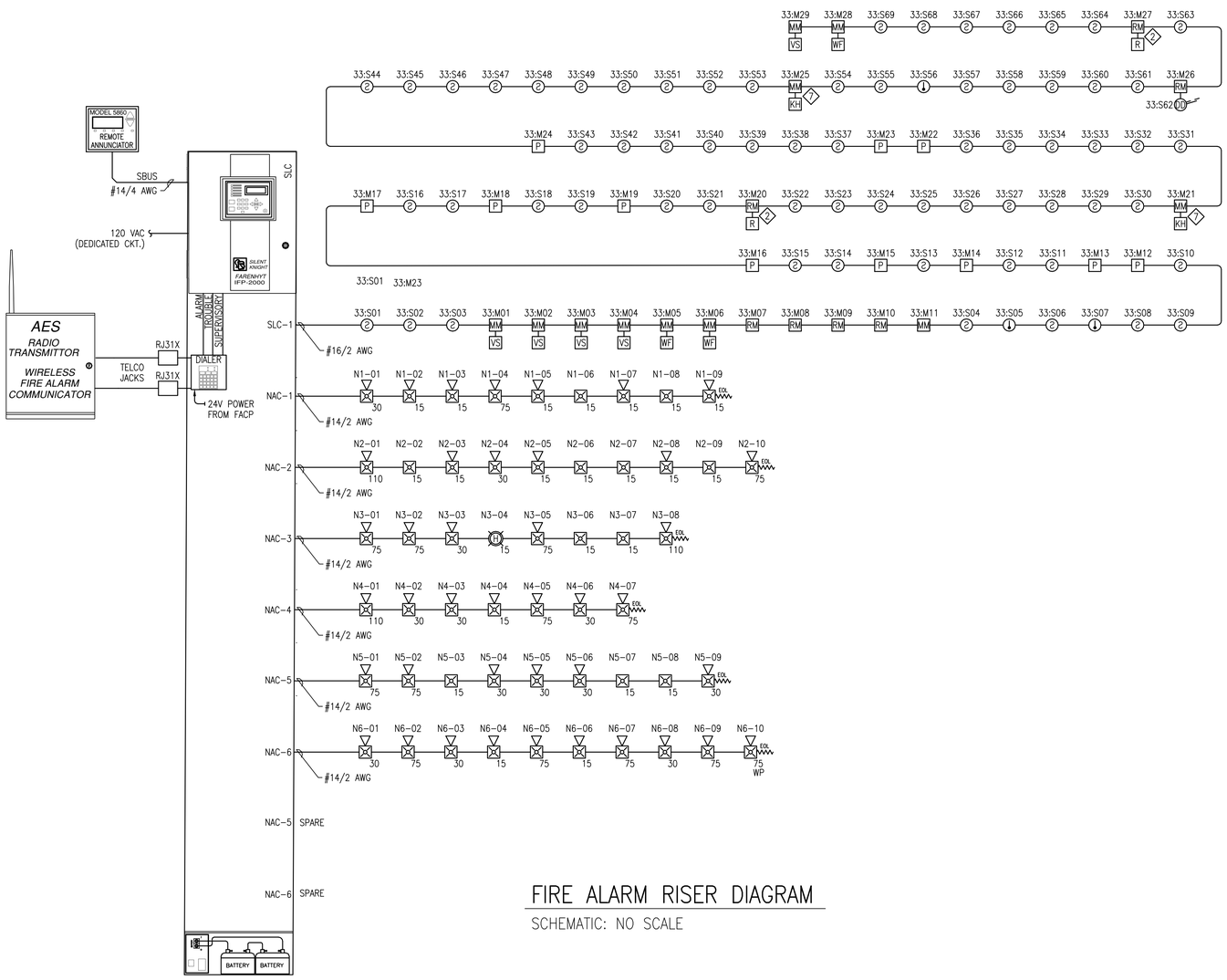

FIRE ALARM RISER DIAGRAM

SCHEMATIC: NO SCALE

FACP Battery Calculation

8/8/2017

PROJECT NAME:	Wayneflete Lower School	
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	0.29000	=	0.29000
SMOKE DETECTOR	65	X	0.00025	=	0.01625
HEAT DETECTOR	3	X	0.00030	=	0.00090
MONITOR MODULE	11	X	0.00500	=	0.05500
DUCT DETECTOR	1	X	0.00030	=	0.00030
RELAY MODULE	7	X	0.00026	=	0.00179
PULL STATION	10	X	0.00030	=	0.00300
TOTAL STANDBY LOAD					0.36724

Regulated Load in ALARM

Device Type	Number of Devices		Current (Amps)		Total Current (Amps)
FACP MAINBOARD	1	X	0.53000	=	0.53000
SMOKE DETECTOR	65	X	0.00650	=	0.42250
HEAT DETECTOR	3	X	0.00650	=	0.01950
MONITOR MODULE	11	X	0.00038	=	0.00413
DUCT DETECTOR	1	X	0.00650	=	0.00650
RELAY MODULE	7	X	0.00026	=	0.00179
PULL STATION	10	X	0.00030	=	0.00300
FACP-1 (See Voltage Drop Calculations)	1	X	0.55100	=	0.55100
FACP-2 (See Voltage Drop Calculations)	1	X	0.69100	=	0.69100
FACP-3 (See Voltage Drop Calculations)	1	X	0.75600	=	0.75600
FACP-4 (See Voltage Drop Calculations)	1	X	0.68000	=	0.68000
FACP-5 (See Voltage Drop Calculations)	1	X	0.66700	=	0.66700
FACP-6 (See Voltage Drop Calculations)	1	X	0.93500	=	0.93500
TOTAL ALARM LOAD					5.26741

Battery Requirements

Standby Load			Required Standby Time in Hours		
Current (Amps)	0.36724	X	24.00000	=	8.81364
Alarm Load			Required Alarm Time in Hours		
Current (Amps)	5.26741	X	0.08333	=	0.43895
Total Ampere Hours (before derating factor)					9.25259
Derating Factor				X	1.2
TOTAL AMPERE HOURS REQUIRED				=	11.10311
BATTERIES TO BE PROVIDED (2 – 12v)					18 AH

Point to Point NAC Voltage Drop Calculation

7/31/2017

Project Name	Wayneflete Lower School			
Circuit Number	FACP-1			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	55	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	3.00	amps		
Total Circuit Current	0.551	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	0.074	55	20.21	0.186	0.91%
Device 2	0.054	10	20.18	0.215	1.06%
Device 3	0.054	60	20.03	0.371	1.82%
Device 4	0.121	50	19.92	0.484	2.37%
Device 5	0.054	30	19.87	0.530	2.60%
Device 6	0.043	40	19.82	0.578	2.83%
Device 7	0.054	20	19.80	0.596	2.92%
Device 8	0.043	15	19.79	0.605	2.97%
Device 9	0.054	25	19.79	0.614	3.01%
Totals	0.551	305			

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

7/31/2017

Project Name	Wayneflete Lower School			
Circuit Number	FACP-2			
Nominal System Voltage	20.4	volts	Wire Gauge	Resistance Per 1000
Minimum Device Voltage	16.0	volts		
Distance from source to 1st device	195	feet	14	3.07
Wire Gauge for balance of circuit			14	3.07
Max Output Current	3.00	amps		
Total Circuit Current	0.691	amps		
End of Line Voltage	19.14	volts		

Circuit is within limits

	Device Current	Distance previous device	Voltage at Device	Drop from source	Percent Drop
Device 1	0.162	195	19.57	0.827	4.06%
Device 2	0.043	20	19.51	0.892	4.37%
Device 3	0.054	20	19.45	0.952	4.67%
Device 4	0.074	20	19.39	1.005	4.93%
Device 5	0.054	25	19.34	1.060	5.20%
Device 6	0.043	25	19.29	1.107	5.42%
Device 7	0.043	15	19.27	1.131	5.54%
Device 8	0.054	35	19.22	1.178	5.77%
Device 9	0.043	50	19.17	1.228	6.02%
Device 10	0.121	40	19.14	1.258	6.16%
Totals	0.691	445			

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)).

REVISION	DESCRIPTION	DATE
0	ISSUED FOR REVIEW & APPROVAL	8/8/17

Reviewed for Code Compliance Inspections Division Authorized Signature Date: 09/20/17

MAINE STATE SECURITY ALARMS
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WAYNFLETE LOWER SCHOOL
360 SPRING STREET
PORTLAND, MAINE 04102
FIRE ALARM RISER AND CALCS

DRAWN	MN UNICAD JOB #17431
CHECKED	BRADY B. HAWS NICET III 138751
DATE	8/8/17
REVISION	0
SCALE	1/8"=1'-0"

shop drawings created by: 5794 W. 4600 So. Hooper, UT 84315 Office: 801.985.0410
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FA-4