

| FCP Battery Calculation | | | | 7/3/2013 |
|---------------------------------------------|-------------------|----------------|--------------------------------|----------------------|
| PROJECT NAME: COFFEE BY DESIGN | | | | |
| Required Standby Time: 24 Hours | | | | |
| Required Alarm Time: 5 Minutes | | | | |
| Regulated Load in Standby | | | | |
| Device Type | Number of Devices | Current (Amps) | | Total Current (Amps) |
| MS-9050UD Main Circuit Board | 1 | X | 0.12000 | = 0.12000 |
| ANN-80 Remote Annunciator | 1 | X | 0.01500 | = 0.01500 |
| SD355 Smoke Detector | 1 | X | 0.00030 | = 0.00030 |
| MMF-301 Mini Monitor Module | 4 | X | 0.00040 | = 0.00160 |
| BG-12LX Pull Station | 1 | X | 0.00023 | = 0.00023 |
| TOTAL STANDBY LOAD | | | | 0.13713 |
| Regulated Load in ALARM | | | | |
| Device Type | Number of Devices | Current (Amps) | | Total Current (Amps) |
| MS-9050UD Main Circuit Board | 1 | X | 0.20000 | = 0.20000 |
| ANN-80 Remote Annunciator | 1 | X | 0.04000 | = 0.04000 |
| All Addressable Devices - Maximum Draw | 1 | X | 0.40000 | = 0.40000 |
| NAC-1 | 1 | X | 0.62100 | = 0.62100 |
| TOTAL ALARM LOAD | | | | 1.26100 |
| Battery Requirements | | | | |
| Standby Load Current (Amps) | 0.13713 | X | Required Standby Time in Hours | 24.00000 |
| | | | | = 3.29112 |
| Alarm Load Current (Amps) | 1.26100 | X | Required Alarm Time in Hours | 0.08333 |
| | | | | = 0.10508 |
| Total Ampere Hours (before derating factor) | | | | 3.39620 |
| Derating Factor | | | | X |
| | | | | = 1.2 |
| TOTAL AMPERE HOURS REQUIRED | | | | 4.07544 |
| BATTERIES TO BE PROVIDED (2 - 12v) | | | | 7 AH |

| FPS1 Battery Calculation | | | | 7/3/2013 |
|---------------------------------------------|-------------------|----------------|--------------------------------|----------------------|
| PROJECT NAME: COFFEE BY DESIGN | | | | |
| Required Standby Time: 24 Hours | | | | |
| Required Alarm Time: 5 Minutes | | | | |
| AC Branch Current | | | | |
| AC Branch Current: 3.2 Amps @ 120V | | | | |
| Regulated Load in Standby | | | | |
| Device Type | Number of Devices | Current (Amps) | | Total Current (Amps) |
| FCPS-24FSB Main Circuit Board | 1 | X | 0.06500 | = 0.06500 |
| TOTAL STANDBY LOAD | | | | 0.06500 |
| Regulated Load in ALARM | | | | |
| Device Type | Number of Devices | Current (Amps) | | Total Current (Amps) |
| FCPS-24FSB Main Circuit Board | 1 | X | 1.14500 | = 1.14500 |
| FPS1-1 | 1 | X | 1.65800 | = 1.65800 |
| FPS1-2 | 1 | X | 1.68200 | = 1.68200 |
| FPS1-3 | 1 | X | 1.26000 | = 1.26000 |
| FPS1-4 | 1 | X | 1.22200 | = 1.22200 |
| TOTAL ALARM LOAD | | | | 5.96700 |
| Battery Requirements | | | | |
| Standby Load Current (Amps) | 0.06500 | X | Required Standby Time in Hours | 24.00000 |
| | | | | = 1.56000 |
| Alarm Load Current (Amps) | 5.96700 | X | Required Alarm Time in Hours | 0.08333 |
| | | | | = 0.49725 |
| Total Ampere Hours (before derating factor) | | | | 2.05725 |
| Derating Factor | | | | X |
| | | | | = 1.2 |
| TOTAL AMPERE HOURS REQUIRED | | | | 2.46870 |
| BATTERIES TO BE PROVIDED (2 - 12v) | | | | 7 AH |

| NAC Circuit Voltage Drop Calculation | | | | 7/3/2013 |
|--------------------------------------|--------------------------|----------------|------------------|---------------------|
| Project Name: COFFEE BY DESIGN | | | | |
| Circuit Number: NAC-1 | | | | |
| Nominal System Voltage | 20.4 volts | Wire Gauge | 14 | Resistance Per 1000 |
| Minimum Device Voltage | 16 volts | | 14 | 6.14 |
| Distance from source to 1st device | 25 | | 14 | 6.14 |
| Wire Gauge for balance of circuit | | | 14 | 6.14 |
| Max Output Current | 1.5 amps | | | |
| Total Circuit Current | 0.621 amps | | | |
| Circuit is within limits | | | | |
| Device | Distance previous device | Device Voltage | Drop from source | Percent Drop |
| Device 1 | 0.079 | 20.30 | 0.10 | 0% |
| Device 2 | 0.066 | 20.30 | 0.10 | 0% |
| Device 3 | 0.066 | 20.27 | 0.13 | 0% |
| Device 4 | 0.079 | 20.24 | 0.16 | 1% |
| Device 5 | 0.066 | 20.19 | 0.21 | 1% |
| Device 6 | 0.079 | 20.16 | 0.24 | 1% |
| Device 7 | 0.079 | 20.11 | 0.29 | 1% |
| Device 8 | 0.107 | 20.10 | 0.30 | 1% |
| Totals | 0.621 | 154 | | |

| NAC Circuit Voltage Drop Calculation | | | | 7/3/2013 |
|--------------------------------------|--------------------------|----------------|------------------|---------------------|
| Project Name: COFFEE BY DESIGN | | | | |
| Circuit Number: FPS1-1 | | | | |
| Nominal System Voltage | 20.4 volts | Wire Gauge | 14 | Resistance Per 1000 |
| Minimum Device Voltage | 16 volts | | 14 | 6.14 |
| Distance from source to 1st device | 40 | | 14 | 6.14 |
| Wire Gauge for balance of circuit | | | 14 | 6.14 |
| Max Output Current | 2.0 amps | | | |
| Total Circuit Current | 1.658 amps | | | |
| Circuit is within limits | | | | |
| Device | Distance previous device | Device Voltage | Drop from source | Percent Drop |
| Device 1 | 0.107 | 19.99 | 0.41 | 2% |
| Device 2 | 0.176 | 19.49 | 0.91 | 4% |
| Device 3 | 0.176 | 19.47 | 0.93 | 5% |
| Device 4 | 0.176 | 19.01 | 1.39 | 7% |
| Device 5 | 0.176 | 19.00 | 1.40 | 7% |
| Device 6 | 0.176 | 18.72 | 1.68 | 8% |
| Device 7 | 0.176 | 18.54 | 1.86 | 9% |
| Device 8 | 0.107 | 18.45 | 1.95 | 10% |
| Device 9 | 0.176 | 18.30 | 2.10 | 10% |
| Device 10 | 0.212 | 18.30 | 2.10 | 10% |
| Totals | 1.658 | 352 | | |

| NAC Circuit Voltage Drop Calculation | | | | 7/3/2013 |
|--------------------------------------|--------------------------|----------------|------------------|---------------------|
| Project Name: COFFEE BY DESIGN | | | | |
| Circuit Number: FPS1-2 | | | | |
| Nominal System Voltage | 20.4 volts | Wire Gauge | 14 | Resistance Per 1000 |
| Minimum Device Voltage | 16 volts | | 14 | 6.14 |
| Distance from source to 1st device | 10 | | 14 | 6.14 |
| Wire Gauge for balance of circuit | | | 14 | 6.14 |
| Max Output Current | 2.0 amps | | | |
| Total Circuit Current | 1.682 amps | | | |
| Circuit is within limits | | | | |
| Device | Distance previous device | Device Voltage | Drop from source | Percent Drop |
| Device 1 | 0.066 | 20.30 | 0.10 | 1% |
| Device 2 | 0.079 | 20.05 | 0.35 | 2% |
| Device 3 | 0.212 | 19.84 | 0.56 | 3% |
| Device 4 | 0.079 | 19.81 | 0.59 | 3% |
| Device 5 | 0.066 | 19.72 | 0.68 | 3% |
| Device 6 | 0.066 | 19.67 | 0.73 | 4% |
| Device 7 | 0.066 | 19.56 | 0.84 | 4% |
| Device 8 | 0.066 | 19.52 | 0.88 | 4% |
| Device 9 | 0.107 | 19.30 | 1.10 | 5% |
| Device 10 | 0.079 | 19.21 | 1.19 | 6% |
| Device 11 | 0.212 | 19.14 | 1.26 | 6% |
| Device 12 | 0.079 | 19.06 | 1.34 | 7% |
| Device 13 | 0.079 | 19.05 | 1.35 | 7% |
| Device 14 | 0.107 | 19.02 | 1.38 | 7% |
| Device 15 | 0.107 | 18.91 | 1.49 | 7% |
| Device 16 | 0.212 | 18.91 | 1.49 | 7% |
| Totals | 1.682 | 265 | | |

| NAC Circuit Voltage Drop Calculation | | | | 7/3/2013 |
|--------------------------------------|--------------------------|----------------|------------------|---------------------|
| Project Name: COFFEE BY DESIGN | | | | |
| Circuit Number: FPS1-3 | | | | |
| Nominal System Voltage | 20.4 volts | Wire Gauge | 14 | Resistance Per 1000 |
| Minimum Device Voltage | 16 volts | | 14 | 6.14 |
| Distance from source to 1st device | 50 | | 14 | 6.14 |
| Wire Gauge for balance of circuit | | | 14 | 6.14 |
| Max Output Current | 2.0 amps | | | |
| Total Circuit Current | 1.260 amps | | | |
| Circuit is within limits | | | | |
| Device | Distance previous device | Device Voltage | Drop from source | Percent Drop |
| Device 1 | 0.290 | 20.02 | 0.38 | 2% |
| Device 2 | 0.176 | 19.73 | 0.67 | 3% |
| Device 3 | 0.290 | 19.57 | 0.83 | 4% |
| Device 4 | 0.290 | 19.36 | 1.04 | 5% |
| Device 5 | 0.290 | 19.27 | 1.13 | 6% |
| Totals | 1.222 | 248 | | |

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 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.
- 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.

APPLICABLE CODES:

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

| FIRE ALARM SYMBOL LEGEND | | |
|--------------------------|---------------------------------|----------------|
| SYMBOL | DESCRIPTION | MOUNTING |
| [FCP] | 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 |
| [H] | HEAT DETECTOR | CEILING |
| [CM] | ADDRESSABLE CONTROL MODULE | FIELD VERIFY |
| [MM] | ADDRESSABLE MONITOR MODULE | FIELD VERIFY |
| [M] | ADDRESSABLE MINI MONITOR MODULE | FIELD VERIFY |
| [P] | MANUAL PULL STATION | WALL @ 48" |
| [R] | CONTROL RELAY (MULTI-VOLTAGE) | FIELD VERIFY |
| [RM] | ADDRESSABLE RELAY MODULE | FIELD VERIFY |
| [M] | MAGNETIC DOOR HOLDER | FIELD VERIFY |
| [WFS] | WATER FLOW SWITCH | BY OTHERS |
| [VTS] | VALVE TAMPER SWITCH | BY OTHERS |
| [LA] | LOW AIR | BY OTHERS |
| [LT] | LOW TEMPERATURE | BY OTHERS |
| [B] | BELL | BY OTHERS |
| [CS] | CEILING MOUNT STROBE | FIELD VERIFY |
| [CHS] | CEILING MOUNT HORN / STROBE | FIELD VERIFY |
| [CMS] | CEILING MOUNT SPEAKER / STROBE | FIELD VERIFY |
| [H] | HORN | WALL @ 10'-0" |
| [HS] | HORN / STROBE | WALL 80"-96" |
| [SS] | SPEAKER / STROBE | WALL 80"-96" |
| [SP] | SPEAKER | WALL @ 90" |
| [S] | STROBE | WALL 80"-96" |
| [KB] | KNOX BOX | FIELD VERIFY |

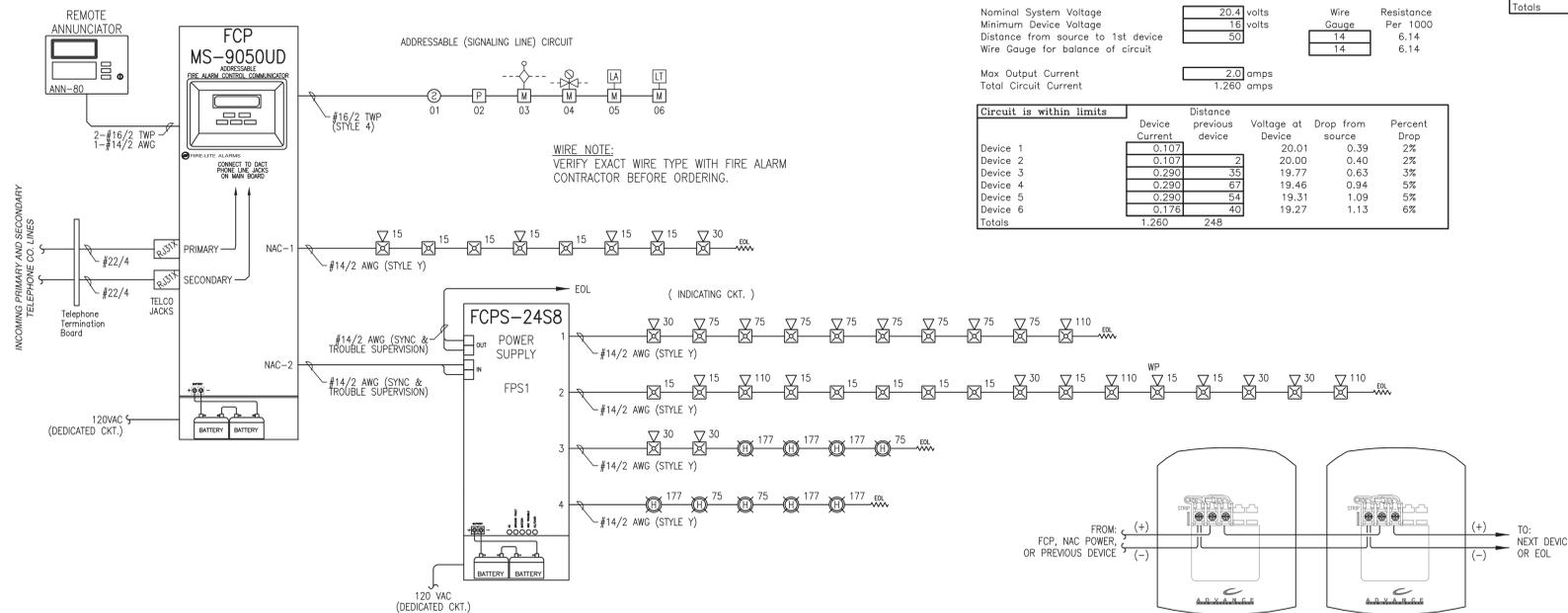
| ABBREVIATION | DESCRIPTION |
|--------------|---------------------------|
| E | EXISTING |
| G | WITH GUARD |
| P | PENDANT MOUNT |
| R | RESIDENTIAL (110V) |
| S | SOUNDER BASE |
| WP | WEATHER PROOF |
| EOL | END OF LINE RESISTOR |
| EOLR | END OF LINE RELAY |
| AWG | AMERICAN WIRE GAUGE |
| TWP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

| SYMBOL | DESCRIPTION |
|-------------------------------------------|----------------|
| [L10001] OR [D01] | DEVICE ADDRESS |
| [L] - DENOTES LOOP # | |
| [D] OR [M] - DENOTES DETECTOR OR MODULE # | |

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

| NAC Circuit Voltage Drop Calculation | | | | 7/3/2013 |
|--------------------------------------|--------------------------|----------------|------------------|---------------------|
| Project Name: COFFEE BY DESIGN | | | | |
| Circuit Number: FPS1-4 | | | | |
| Nominal System Voltage | 20.4 volts | Wire Gauge | 14 | Resistance Per 1000 |
| Minimum Device Voltage | 16 volts | | 14 | 6.14 |
| Distance from source to 1st device | 50 | | 14 | 6.14 |
| Wire Gauge for balance of circuit | | | 14 | 6.14 |
| Max Output Current | 2.0 amps | | | |
| Total Circuit Current | 1.222 amps | | | |
| Circuit is within limits | | | | |
| Device | Distance previous device | Device Voltage | Drop from source | Percent Drop |
| Device 1 | 0.290 | 20.02 | 0.38 | 2% |
| Device 2 | 0.176 | 19.73 | 0.67 | 3% |
| Device 3 | 0.290 | 19.57 | 0.83 | 4% |
| Device 4 | 0.290 | 19.36 | 1.04 | 5% |
| Device 5 | 0.290 | 19.27 | 1.13 | 6% |
| Totals | 1.222 | 248 | | |

| OPERATIONS MATRIX | | | | | | | | | | |
|--------------------------|--|--------------------------|------------------------|--------------------------------|-------------------------------------|----------------------------|------------------------------------|-----------------------|-----------------------------|-------------------------|
| FIRE ALARM INPUT | | FIRE ALARM OUTPUT | | | | | | | | |
| | | ACTIVATE ALARM INDICATOR | ACTIVATE AUDIBLE ALARM | ACTIVATE SUPERVISORY INDICATOR | ACTIVATE AUDIBLE SUPERVISORY SIGNAL | ACTIVATE TROUBLE INDICATOR | ACTIVATE AUDIBLE TROUBLE INDICATOR | TRANSMIT ALARM SIGNAL | TRANSMIT SUPERVISORY SIGNAL | TRANSMIT TROUBLE SIGNAL |
| SMOKE DETECTORS | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| PULL STATIONS | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| WATERFLOW SWITCHES | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| VALVE TAMPER SWITCHES | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| LOW AIR SWITCHES | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| LOW TEMPERATURE SWITCHES | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 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

TYPICAL 2 WIRE STROBE WIRING DETAIL
 SCHEMATIC: NO SCALE

MANUAL PULL STATION WIRING DETAIL
 SCHEMATIC: NO SCALE

SPRINKLER SWITCHES WIRING DETAIL
 SCHEMATIC: NO SCALE

| REVISION | DESCRIPTION | DATE |
|----------|------------------------------|----------|
| 0 | ISSUED FOR REVIEW & APPROVAL | 7/5/2013 |

CUNNINGHAM
Security Systems
 10 Princess Point Road, Yarmouth, Maine 04096
 Office: 207.846.3350 • Fax: 207.846.6080

COFFEE BY DESIGN
 DIAMOND ST. WAREHOUSE RENOVATION
 1-11 DIAMOND ST., PORTLAND, ME
 CALCS, DETAILS, LEGEND, MATRIX, NOTES

| | |
|---------|-----|
| DRAWN | JPB |
| CHECKED | WAY |