MONTANA STATE UNIVERSITY - BOZEMAN

MADISON AND JEFFERSON HALL FIRE ALARM REPLACEMENT

PPA #21-0138

100% CONSTRUCTION DOCUMENT BID SET

AUGUST 12, 2022

DRAWING INDEX

AREA OF WORK
GENERAL NOTES

DEMO ALL EXISTING DEVICES AND EQUIPMENT
DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.

SHEET NOTES

PRIOR TO FIRE ALARM BEING DEMOED RELOCATE 120VAC BELL CIRCUIT TO OUTSIDE AT FDC AND INSTALL 120V HORN STROBE. ONCE FIRE ALARM UPGRADE IS COMPLETED AND BUILDING IS PROTECTED CHANGE THIS DEVICE TO 24V NAC SET TO WATERFLOW ONLY.
GENERAL NOTES
1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
3. EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.

SHEET NOTES
Prior to fire alarm being demoed, minor adjustments will be made to ensure all existing conduits are cut and removed. New conduit routes will follow existing conduit paths concealed above ceiling.

Remove this device and cover opening with listed weatherproof cover.

NEW CONDUIT ROUTE THROUGH BASEMENT TO FACP DO NOT RUN WITH OTHER FIRE ALARM CONDUCTORS

FAA 21-0138

REV.

DESCRIPTION

DATE

REVIEWED BY:

DRAWN BY:

SHEET

MADISON AND JEFFERSON HALL FIRE ALARM REPLACEMENT

MONTANA STATE UNIVERSITY

BOZEMAN, MONTANA

PHONE:  406.994.5413

FAX:  406.994.5665

www.coffman.com

ph 406.582.1936
751 Osterman Dr., Suite 104
Bozeman, MT 59715

FA1.1

DATE

08-12-2022

MADISON MAIN FLOOR PLAN - FIRE ALARM DEMO PLAN
GENERAL NOTES

1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
3. EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.
GENERAL NOTES
1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.

SHEET NOTES
EXISTING CONDUIT WIRING FOR SHUNT TRIP BREAKER AND POWER TO BREAKER TO REMAIN.
EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.

APP 21-0138
REV. 1
DESCRIPTION
DATE
REVIEWED BY:
DRAWN BY:

MADISON AND JEFFERSON HALL
FIRE ALARM REPLACEMENT
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE:  406.994.5413
FAX:  406.994.5665
www.coffman.com
ph 406.582.1936
751 Osterman Dr., Suite 104
Bozeman, MT 59715

MADISON THIRD FLOOR - FIRE ALARM DEMO PLAN
GENERAL NOTES
1. DEMO ALL EXISTING FIRE ALARM DEVICES AND EQUIPMENT UNLESS OTHERWISE NOTED.
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS.
3. EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.

SHEET NOTES
Before fire alarm component is removed from its location, a bell test will be performed to confirm the correct operation. Should the alarm component be intermittent, a fault code should be installed on the panel. In the event of a fire alarm failure, an alarm rate of 100% should be set to the equipment.

JEFFERSON BASEMENT FLOORPLAN - FIRE ALARM DEMO PLAN
GENERAL NOTES
1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
3. EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.

SHEET NOTES
1. PRIOR TO FIRE ALARM DEMO BEGINS NEW CIRCUIT TO FOLLOW EXISTING CONDUIT PATH TO FACP. REMOVE EXISTING WATERFLOW ONLY HORN STROBE AND MOVE 120VAC BELL CIRCUIT TO OUTSIDE AT FDC. ONCE FIRE ALARM UPGRADE IS COMPLETED AND BUILDING IS PROTECTED CHANGE THIS DEVICE TO 24VAC SET TO WATERFLOW ONLY. REMOVE THIS DEVICE AND COVER OPENING WITH LISTED WEATHERPROOF COVER.

JEFFERSON MAIN FLOOR - FIRE ALARM DEMO PLAN
JEFFERSON SECOND FLOOR PLAN - FIRE ALARM DEMO PLAN

GENERAL NOTES

1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
3. EXISTING CONDUIT PATHS TO REMAIN AND BE RE-USED.
GENERAL NOTES

1. DEMO ALL EXISTING DEVICES AND EQUIPMENT
2. DEMO ALL EXISTING CIRCUITS. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS CONCEALED ABOVE CEILING.
3. EXISTING CONDUIT AND WIRING FOR SHUNT TRIP BREAKER AND POWER TO BREAKER TO REMAIN.

SHEET NOTES

EXISTING CONDUIT WIRING FOR SHUNT TRIP BREAKER AND POWER TO BREAKER TO REMAIN.
NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS UNLESS OTHERWISE NOTED.

NEW DEVICES TO BE EDWARDS PLACED IN SAME LOCATIONS AS DEMOED DEVICES.

LOCATION OF WIRE RUNS ARE ILLUSTRATIVE ONLY. START CIRCUIT RUN AT EXPOSED BOX AND RUN IN WIRING TO NEW DETECTION IN CORRIDOR TO BE INSTALLED IN WIRE MOLD INSTALLED AT CEILING.

APPROXIMATE LOCATION OF EXISTING SMOKE DAMPERS

WIRE AND CABLE LEGEND

- APPROXIMATE LOCATION OF EXISTING SMOKE DAMPERS
- WIRE MOULD ALONG CEILING

MADISON AND JEFFERSON HALL
FIRE ALARM REPLACEMENT

FA3.2

DATE
08-12-2022
GENERAL NOTES

1. NEW DEVICES TO BE EDWARDS PLACED IN SAME LOCATIONS AS DEMOED DEVICES.
   NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS UNLESS OTHERWISE NOTED.

SHEET NOTES

- WIRING TO NEW DETECTION IN CORRIDOR TO BE INSTALLED IN WIRE MOLD INSTALLED AT CEILING.
- LOCATION OF WIRE RUNS ARE ILLUSTRATIVE ONLY. START CIRCUIT RUN AT EXPOSED BOX AND RUN IN WIRE MOLD ALONG CEILING.

WIRE AND CABLE LEGEND

<table>
<thead>
<tr>
<th>TAG</th>
<th>TYPE</th>
<th>CIRCUIT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 #14 THHN/14/2 FPLP</td>
<td>AUDIBLE BASE POWER</td>
</tr>
<tr>
<td>L</td>
<td>18/2 FPLP</td>
<td>SIGNAL LINE CIRCUIT</td>
</tr>
<tr>
<td>N</td>
<td>2 #14 THHN/14-2FPLP</td>
<td>NOTIFICATION CIRCUIT</td>
</tr>
<tr>
<td>P</td>
<td>2 #14 THHN/14-2FPLP</td>
<td>24VDC AUX POWER FOR ADA STROBES</td>
</tr>
<tr>
<td>R</td>
<td>16/4 SHIELDED TWISTED</td>
<td>REMOTE ANNUNCIATOR CABLE</td>
</tr>
</tbody>
</table>

INSTALLING CONTRACTOR SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES AND MAINTAIN COLOR CODE THROUGH EACH CIRCUIT.

COORDINATION WITH ELEVATOR CONTRACTOR FOR ACCESS TO ELEVATOR SHAFT IS THE RESPONSIBILITY OF INSTALLING CONTRACTOR.

1. **MADISON AND JEFFERSON HALL**
2. **FIRE ALARM REPLACEMENT**
JEFFERSON BASEMENT FLOORPLAN - FIRE ALARM NEW PLAN

GENERAL NOTES
1. NEW DEVICES TO BE EDWARDS PLACED IN SAME LOCATIONS AS DEMOED DEVICES.
2. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS.

SHEET NOTES
1. EXISTING CIRCUIT TO HVAC CONTROLS FOR SMOKE DAMPER SHUTDOWN TO REMAIN.
2. EXISTING CIRCUITS ROUTED TO NORTH HEDGES TO REMAIN. EXISTING WIRING TO BE REUSED.
3. FIELD LOCATE HEAT DETECTORS IN ELEVATOR CONTROL ROOMS TO MATCH QUANTITY OF SPRINKLER HEAD AND SPACE 24" FROM EACH SPRINKLER HEAD.

WIRE AND CABLE LEGEND
<table>
<thead>
<tr>
<th>TAG</th>
<th>TYPE</th>
<th>CIRCUIT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 #14 THHN/14-2FPLP</td>
<td>AUDIBLE BASE POWER</td>
</tr>
<tr>
<td>L</td>
<td>18/2 FPLP</td>
<td>SIGNAL LINE CIRCUIT</td>
</tr>
<tr>
<td>N</td>
<td>2 #14 THHN/14-2FPLP</td>
<td>NOTIFICATION CIRCUIT</td>
</tr>
<tr>
<td>P</td>
<td>2 #14 THHN/14-2FPLP</td>
<td>24VDC AUX POWER FOR ADA STROBES</td>
</tr>
<tr>
<td>R</td>
<td>16/4 SHIELDED TWISTED</td>
<td>REMOTE ANNUNCIATOR CABLE</td>
</tr>
</tbody>
</table>

INSTALLING CONTRACTOR SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES AND MAINTAIN COLOR THROUGHOUT EACH CIRCUIT.
INSTALLING CONTRACTOR SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES.

- **FIRE ALARM**
  - 18/2 FPLP

**CIRCUIT DESCRIPTION**

**TAG**

**SHEET TITLE**

**GENERAL NOTES**

1. **FA100** REV. 100% bid.
2. MATERIAL TO BE INCLUDED IN BID OR SPECIFIED IN BILL OF MATERIALS.

**INSTALLATION**

- **APPARENT'S LOCATIONS**: SCHEDULED CIRCUIT TYPES.
- **INSTALLING CONTRACTOR** SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES.
- **FA100** REV.

**REVIEWED BY**:

- L1-50
- A4-05
- A4-07
- L1-26
- A3-01
- L1-49
- A3-04
- LFSB
- www.coffman.com
  - 751 Osterman Dr., Suite 104

**DATE**

- 08-12-2022

**FA4.1**

**MADISON AND JEFFERSON HALL**

**FIRE ALARM REPLACEMENT**
1. GENERAL NOTES
   - New devices to be installed in same locations as existing devices.
   - New circuits to follow existing conduit path as noted in previous SHEET NOTES.

2. SHEET NOTES
   - Wiring to be installed in accordance with the approved plan.
   - Installing contractor shall provide color-coded cable for equipment circuit types.
   - Approximate location of existing smoke dampers.

NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS UNLESS OTHERWISE NOTED.
NEW DEVICES TO BE EDWARDS PLACED IN SAME LOCATIONS AS DEMOED DEVICES.

NEW PLAN
INSTALLING CONTRACTOR SHALL PROVIDE COLOR-CODED CABLE FOR DIFFERENT CIRCUIT TYPES.
AND DEVICES CLOSER TO TERMINALS BACK PIN.

JEFFERSON SECOND FLOORPLAN - FIRE ALARM NEW PLAN

WIRE AND CABLE LEGEND

FA4.2
08-12-2022

GENERAL NOTES

1. NEW DEVICES TO BE EDWARDS PLACED IN SAME LOCATIONS AS DEMOED DEVICES.
2. NEW CIRCUITS TO FOLLOW EXISTING CONDUIT PATHS UNLESS OTHERWISE NOTED.

SHEET NOTES

INSTALLING CONTRACTOR SHALL PROVIDE COLOR CODED CABLING FOR DIFFERENT CIRCUIT TYPES AND MAINTAIN COLOR CODE THROUGHOUT EACH CIRCUIT.

WIRE AND CABLE LEGEND

<table>
<thead>
<tr>
<th>TAG</th>
<th>TYPE</th>
<th>CIRCUIT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2 #14 THHN/14-2 FPLP</td>
<td>AUDIBLE BASE POWER</td>
</tr>
<tr>
<td>L</td>
<td>18/2 FPLP</td>
<td>SIGNAL LINE CIRCUIT</td>
</tr>
<tr>
<td>N</td>
<td>2 #14 THHN/14-2 FPLP</td>
<td>NOTIFICATION CIRCUIT</td>
</tr>
<tr>
<td>P</td>
<td>2 #14 THHN/14-2 FPLP</td>
<td>24VDC AUX POWER FOR ADA STROBES</td>
</tr>
<tr>
<td>R</td>
<td>16/4 SHIELDED TWISTED</td>
<td>REMOTE ANNUNCIATOR CABLE</td>
</tr>
</tbody>
</table>

COORDINATION WITH ELEVATOR CONTRACTOR FOR ACCESS TO ELEVATOR SHAFT IS THE RESPONSIBILITY OF THIS CONTRACTOR.

JEFFERSON THIRD FLOOR - FIRE ALARM NEW PLAN
NAC-1 TO NAC-12 (EST BPS10A) - HORN/STROBE, AUX POWER SUPPLY

DEDICATED BRANCH 120VAC, 4A, 50/60HZ

KNOCKOUTS ONLY

THROUGH THESE
ROUTE AC SUPPLY - FROM ALL POWER LIMITED CIRCUITS

NOTE: ROUTE POWER WIRING AWAY CIRCUIT + TO GND

TB1

BATTERY 12V 10AH

NO T-TAPS PERMITTED

N1 NAC1 - NAC2 + - NAC3 + - NAC4

TB2

IN+ COM OUT+ OUT+ COM IN+ NO COM NC

Sense 2 Trouble

TB3 TB4

BATTERY 12V 10AH

S1 S2 4 3 2 1

AC RATE AB AUX 8 7 6 5

12 11 10 9

JP2 JP1 ON

Sense 1 Trouble

TB5

NOTICE: CONFIGURE ALL FOUR NAC/AUX CIRCUITS AS AUX CIRCUITS. SET SW2-6 TO ON. USE SIGA-CT2 TO MONITOR SENSE 1 AND TROUBLE CONTACTS (TYPICAL APS10A'S)

BPS-1

BPS-2

BPS-3
NORTH HEDGES REMOTE ANNUNCIATOR PLACEMENT

FAA REMOTE ANN CKT TO MADISON
FAA REMOTE ANN CKT TO JEFFERSON
NORTH HEDGES REMOTE ANNUNCIATOR PLACEMENT

SHEET NOTES
OLD ANNUNCIATORS TO BE REMOVED AND REPLACED WITH NEW
EXISTING WIRE AND CONDUIT PATH TO BE REUSED IF POSSIBLE

PPA 21-0138
REV.
DESCRIPTION
DATE
REVIEWED BY:
DRAWN BY:

MADISON AND JEFFERSON HALL
FIRE ALARM REPLACEMENT

MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

www.coffman.com
ph 406.582.1936
751 Osterman Dr., Suite 104
Bozeman, MT 59715

MADISON AND JEFFERSON HALL
FIRE ALARM REPLACEMENT

FA6.2
DATE
08-12-2022

FILE: Aug 12, 2022 - 1:55pm - 212098 MSU Madison-Jefferson FA Replace - Master -100% bid.dwg
C:\Users\RANDY~1.SAI\AppData\Local\Temp\AcPublish_21852\
<table>
<thead>
<tr>
<th>Distance</th>
<th>Device Manufacturer</th>
<th>Device</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.80</td>
<td>UL Max</td>
<td>10</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>18.83</td>
<td>6.95%</td>
<td>11</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>19.04</td>
<td>5.93%</td>
<td>12</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>19.16</td>
<td>3.00%</td>
<td>13</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>19.38</td>
<td>2.04%</td>
<td>14</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>20.02</td>
<td>1.56%</td>
<td>15</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>20.16</td>
<td>1.32%</td>
<td>16</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>20.20</td>
<td>1.17%</td>
<td>17</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>20.40</td>
<td>1.03%</td>
<td>18</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>20.70</td>
<td>0.81%</td>
<td>19</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>21.00</td>
<td>0.61%</td>
<td>20</td>
<td>1.562</td>
<td>1.601</td>
<td>1.670</td>
<td>1.740</td>
<td>1.810</td>
<td>1.874</td>
<td>1.938</td>
<td>1.989</td>
<td>2.040</td>
<td>2.091</td>
<td>2.142</td>
</tr>
<tr>
<td>Device</td>
<td>Minimum Allowed Device Voltage</td>
<td>Distance</td>
<td>Current (mA)</td>
<td>Current Drop</td>
<td>Percent Drop</td>
<td>End of Line Voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------------------------</td>
<td>----------</td>
<td>--------------</td>
<td>--------------</td>
<td>--------------</td>
<td>-------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device 20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The table above contains data related to load loss calculations and current/percent drop for various devices. The calculations are based on specific measurements and standards.
### Battery Sizing Calculations

#### Field Equipment

<table>
<thead>
<tr>
<th>Device</th>
<th>Quantity</th>
<th>Current (ma)</th>
<th>Total (amp-hr)</th>
<th>Additional Capacity Current (amp-hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-MODCOM</td>
<td>95</td>
<td>147</td>
<td>95</td>
<td>147</td>
</tr>
<tr>
<td>4-ANNCPU</td>
<td>250</td>
<td>125</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>4-24L18S</td>
<td>218</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>4-24L12S</td>
<td>3</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>4-6ANN</td>
<td>125</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>4-8ANN</td>
<td>92</td>
<td>125</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>4-ANNAUDTEL</td>
<td>1</td>
<td>211</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td>4-FT</td>
<td>1</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>4-FWAL-1/2/3/4</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>4-NET-SMD</td>
<td>0</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>4-NET-AD</td>
<td>0</td>
<td>5.6</td>
<td>5.6</td>
<td>5.6</td>
</tr>
<tr>
<td>4-LCDAUDTELANN</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-SM</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-AD</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-TP(-HC)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Field Equipment

<table>
<thead>
<tr>
<th>Device</th>
<th>Quantity</th>
<th>Current (ma)</th>
<th>Total (amp-hr)</th>
<th>Additional Capacity Current (amp-hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-MODCOM</td>
<td>95</td>
<td>147</td>
<td>95</td>
<td>147</td>
</tr>
<tr>
<td>4-ANNCPU</td>
<td>250</td>
<td>125</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>4-24L18S</td>
<td>218</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>4-24L12S</td>
<td>3</td>
<td>93</td>
<td>93</td>
<td>93</td>
</tr>
<tr>
<td>4-6ANN</td>
<td>125</td>
<td>98</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>4-8ANN</td>
<td>92</td>
<td>125</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>4-ANNAUDTEL</td>
<td>1</td>
<td>211</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td>4-FT</td>
<td>1</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>4-FWAL-1/2/3/4</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>4-NET-SMD</td>
<td>0</td>
<td>38</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>4-NET-AD</td>
<td>0</td>
<td>5.6</td>
<td>5.6</td>
<td>5.6</td>
</tr>
<tr>
<td>4-LCDAUDTELANN</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-SM</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-AD</td>
<td>0</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>4-NET-TP(-HC)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Battery Sizing Calculations

#### Design Alarm Current

- Requirement for standby current (hours): 34.30 amp-hr

#### Requirement for alarm current (minutes)

- 1 minute = 6.89 amp-hr

#### Battery Sizing Calculations

FAX: 406.994.5665

MSU-CPDC

**UNIVERSITY OF MONTANA**

**MADISON AND JEFFERSON HALL**

**FIRE ALARM REPLACEMENT**

**FIRE ALARM PANEL POWER/BATTERY CALCULATIONS**

**DATE:** 08/12/2022

**FA7.2**