

Project Name: Massachusetts

Address:

OUTDOOR DESIGN CONDITIONS

Weather station: Lawrence Municipal AP

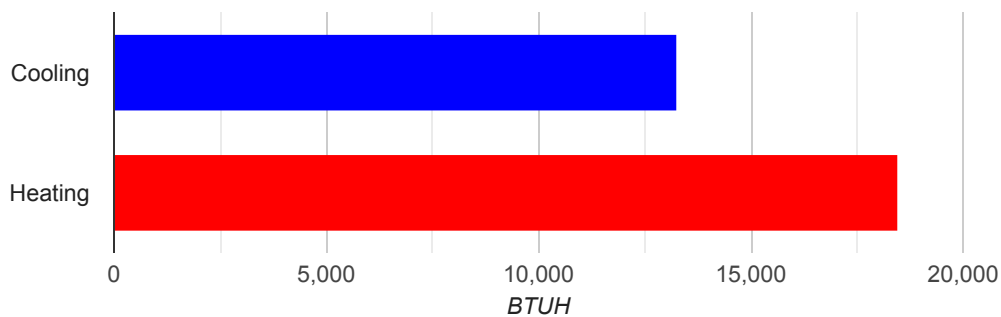
| | | | | | | | |
|-------------------|----|------------------|----|----------------|----|-----------------|--------|
| Summer Outdoor F: | 88 | Summer Indoor F: | 75 | Design Grains: | 31 | Daily Range: | Medium |
| Winter Outdoor F: | 9 | Winter Indoor F: | 70 | Cooling RH: | 50 | Elevation (Ft): | 151 |

LOAD CALCULATION TOTALS

HVAC System: Zone 3,4,5

| | | | |
|---------------------------------|-------|-------------------|--------|
| Heated square footage: | 870 | Heating BTUH: | 18,464 |
| Cooled square footage: | 870 | Cooling BTUH: | 13,247 |
| Heated volume (above grade CF): | 9,582 | CFM: | 583 |
| Cooled volume (above grade CF): | 9,582 | Sensible cooling: | 11,556 |
| Exposed wall area (SF): | 1,113 | Latent cooling: | 1,691 |
| | | SHR: | 0.872 |

Load Calculation



Approved ACCA MJ8 Calculations

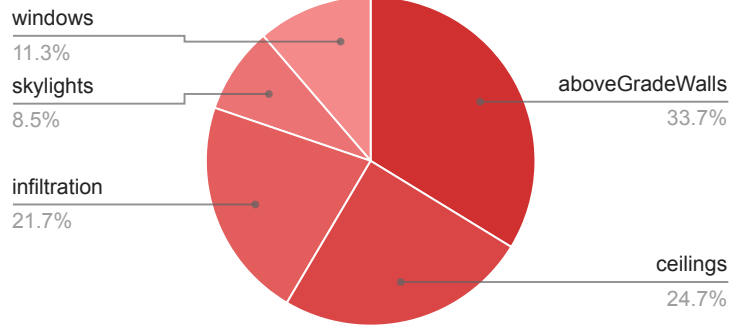
Calculations are based on the ACCA Manual J 8th Edition and are approved by ACCA. All computed calculations are estimates on building use, weather data, and inputted values such as R-Values, window types, duct loss, etc. Equipment selections should meet both the latent and sensible gain as well as building heat loss.



HEATING AND COOLING LOADS

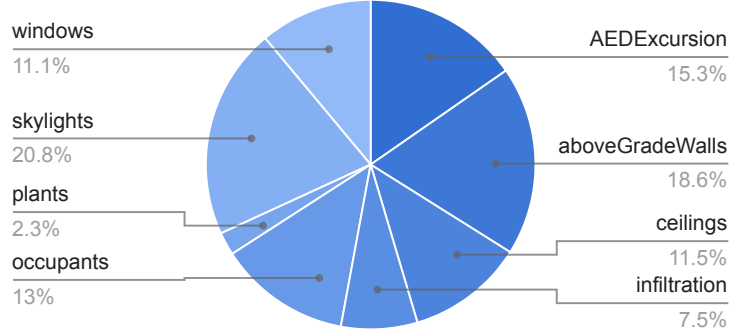
| HEATING LOADS | | |
|-----------------|-------|-----------|
| SECTION | AREA | HEAT LOSS |
| aboveGradeWalls | 1,053 | 6,231 |
| ceilings | 846 | 4,568 |
| infiltration | 0 | 4,012 |
| skylights | 24 | 1,566 |
| windows | 60 | 2,086 |
| Totals | | 18,464 |

Heating Loads



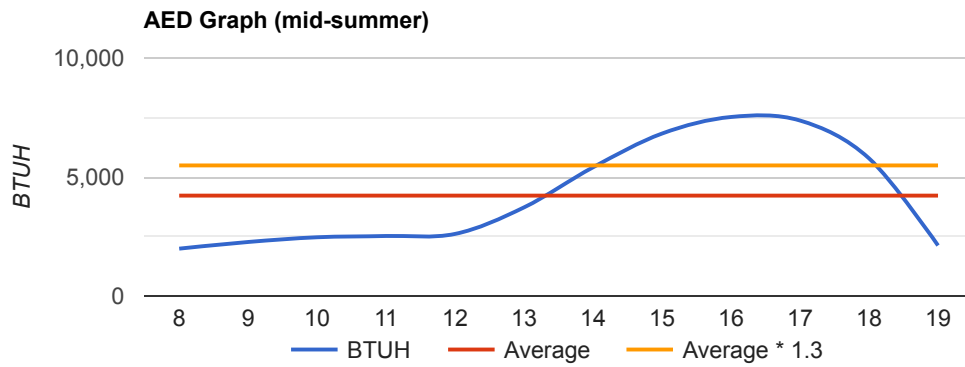
| COOLING LOADS | | | |
|-----------------|-------|----------|--------|
| SECTION | AREA | SENSIBLE | LATENT |
| AEDExcursion | 0 | 2,032 | 0 |
| aboveGradeWalls | 1,053 | 2,462 | 0 |
| ceilings | 846 | 1,523 | 0 |
| infiltration | 0 | 401 | 591 |
| occupants | 0 | 920 | 800 |
| plants | 0 | 0 | 300 |
| skylights | 24 | 2,753 | 0 |
| windows | 60 | 1,467 | 0 |
| Totals | | 11,556 | 1,691 |

Cooling Loads

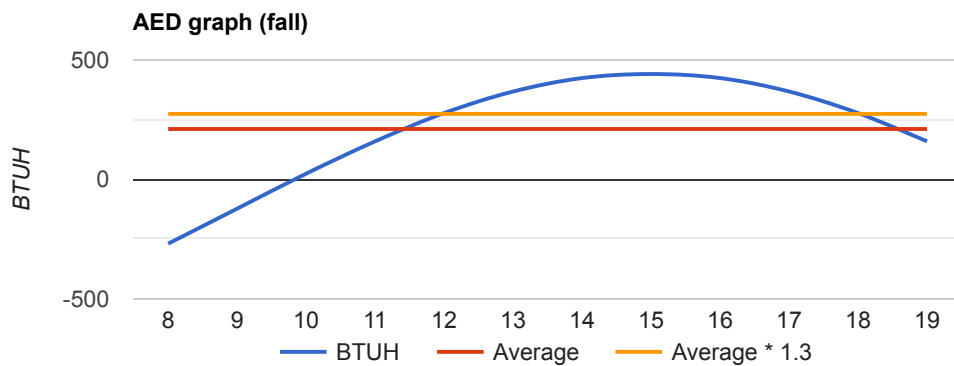


FENESTRATION LOADS

Warning (0): This application has glass areas that produced large cooling loads for part of the day. Zoning may be required to overcome solar load spikes for one or more rooms. Consider a zoned system, or provide zone control (individual, motorized, thermostatically controlled dampers) for problem rooms. Single speed equipment may not be suitable for the application.



This graph represents hourly aggregate fenestration loads in mid-summer.



This graph represents hourly aggregate fenestration loads in October.

COMPONENT LOADS

| ABOVE GRADE WALLS | | | | | | |
|---|------------------------------|-------------------|--------------------|----------|--------------------------------|--------------|
| System generated wall - N Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | E 210 | Heating BTUH: Cooling BTUH: | 1,243 491 |
| System generated wall - S Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | W 130 | Heating BTUH: Cooling BTUH: | 769 304 |
| System generated wall - N Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | N 162 | Heating BTUH: Cooling BTUH: | 959 379 |
| System generated wall - E Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | E 124 | Heating BTUH: Cooling BTUH: | 734 290 |
| System generated wall - W Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | W 130 | Heating BTUH: Cooling BTUH: | 769 304 |
| System generated wall - E Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | N 36 | Heating BTUH: Cooling BTUH: | 213 84 |
| System generated wall - S Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | E 111 | Heating BTUH: Cooling BTUH: | 657 259 |
| System generated wall - S Frame Wall, Wood framing, R-11 cavity insulation, Stucco or Siding. | Construction nr: U Value: | 12B-0s w 0.097 | Exposure: Area: | S 150 | Heating BTUH: Cooling BTUH: | 888 351 |

| BELOW GRADE WALLS | | | | | | |
|---|--|--|--|--|--|--|
| There are no components for this section. | | | | | | |

| WINDOWS | | | | | | |
|---|--|---------------|-------------------|--------------|--------------------------------|------------|
| Default small windows for wall id 2499595 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 6 W | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 209 183 |
| Default medium windows for wall id 2499595 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 24 W | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 834 733 |
| Default small windows for wall id 2499602 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 6 N | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 209 76 |
| Default medium windows for wall id 2499602 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 12 N | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 417 153 |
| Default small windows for wall id 2499603 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 6 E | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 209 161 |
| Default small windows for wall id 2499584 Window, NFRC rated, Clear glass. | Construction nr: Area: Exposure: | 1G 6 E | U Value: SHGC: | 0.57 0.56 | Heating BTUH: Cooling BTUH: | 209 161 |

Window cooling BTUHs shown here are daily average values. See AED graphs for details of fenestration loads during the day.

CEILINGS

| | | | | | | |
|--|------------------------------|--------------|-------|-----|--------------------------------|--------------|
| System generated ceiling. Ceiling under encapsulated attic. | Construction nr: U Value: | tbl4E 0.6 | Area: | 423 | Heating BTUH: Cooling BTUH: | 2,284 761 |
| System generated ceiling. Ceiling under encapsulated attic. | Construction nr: U Value: | tbl4E 0.6 | Area: | 234 | Heating BTUH: Cooling BTUH: | 1,264 421 |
| Small upstairs bedroom ceiling Ceiling under encapsulated attic. | Construction nr: U Value: | tbl4E 0.6 | Area: | -6 | Heating BTUH: Cooling BTUH: | -32 -11 |
| System generated ceiling. Ceiling under encapsulated attic. | Construction nr: U Value: | tbl4E 0.6 | Area: | 195 | Heating BTUH: Cooling BTUH: | 1,053 351 |

SKYLIGHTS

| | | | | | | |
|--|------------------|--------|--------------------|---------|--------------------------------|----------------|
| Default skylight(s) for ceiling id 673806. Flat, Clear glass, Double pane. | Construction nr: | 8Bc-3" | Exposure: Area: | W 18 | Heating BTUH: Cooling BTUH: | 1,175 2,064 |
| Default skylight(s) for ceiling id 674042. Flat, Clear glass, Double pane. | Construction nr: | 8Bc-3" | Exposure: Area: | W 6 | Heating BTUH: Cooling BTUH: | 392 688 |

Skylight cooling BTUHs shown here are daily average values. See AED graphs for details of fenestration loads during the day.

DOORS

There are no components for this section.

FLOORS

There are no components for this section.

VENTILATION

There are no components for this section.

HOT WATER PIPING

There are no components for this section.

DUCTS

There are no components for this section.

INFILTRATION

| | | | | | |
|-------------------|---------|---------------|-----|----------------|-------|
| Leakage Category: | Average | NCFM Heating: | 230 | Heating BTUH: | 4,012 |
| | | NCFM Cooling: | 108 | Sensible BTUH: | 401 |
| | | | | Latent BTUH: | 591 |

BLOWER MOTOR

There are no components for this section.

WINTER HUMIDIFICATION

There are no components for this section.

OCCUPANTS

| | | | | | |
|----------------|---|----------------|-----|--------------|-----|
| Nr. Occupants: | 4 | Sensible BTUH: | 920 | Latent BTUH: | 800 |
|----------------|---|----------------|-----|--------------|-----|

APPLIANCES

There are no components for this section.

PLANTS

PLANTS

| | | | | | |
|-------------|--------|-----------|---|--------------|-----|
| Plant Size: | small | Quantity: | 5 | Latent BTUH: | 50 |
| Plant Size: | medium | Quantity: | 5 | Latent BTUH: | 100 |
| Plant Size: | large | Quantity: | 5 | Latent BTUH: | 150 |

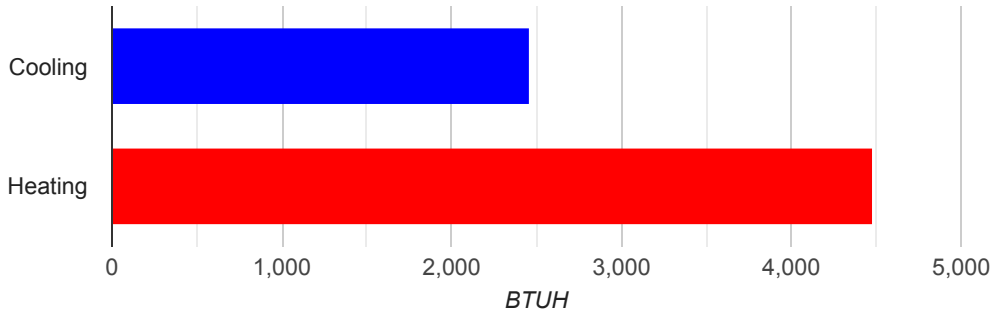
ROOM DETAIL

Room name: Small BR

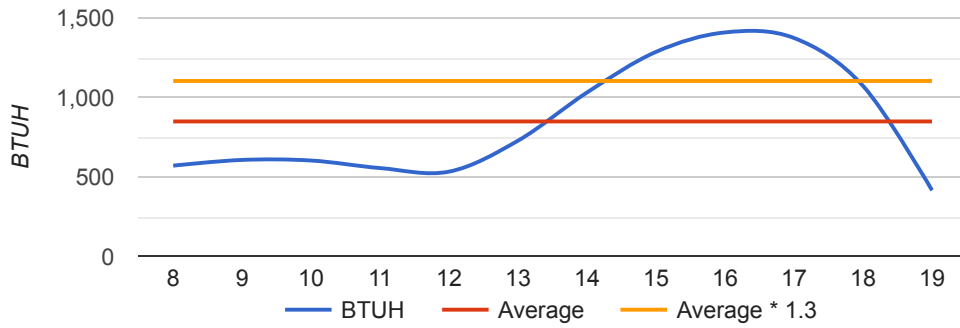
Heated square footage: 195
Cooled square footage: 195
Heated volume (above grade CF): 1,950
Cooled volume (above grade CF): 1,950
Exposed wall area (SF): 303

Total Cooling BTUH: 2,459
Total Heating BTUH: 4,470
CFM: 116

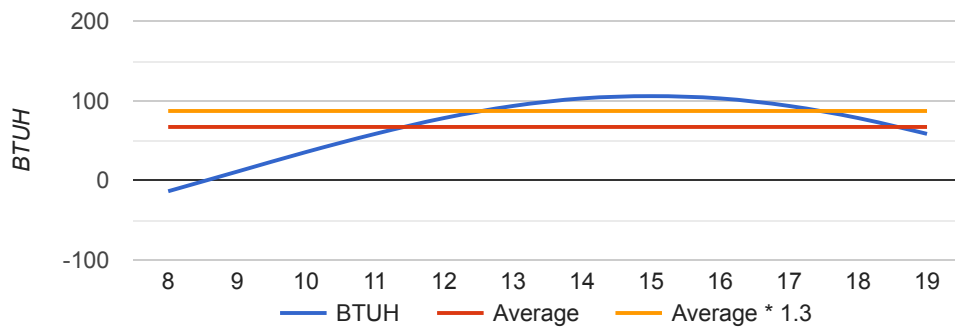
Load Calculation



AED Graph (mid-summer)



AED graph (fall)

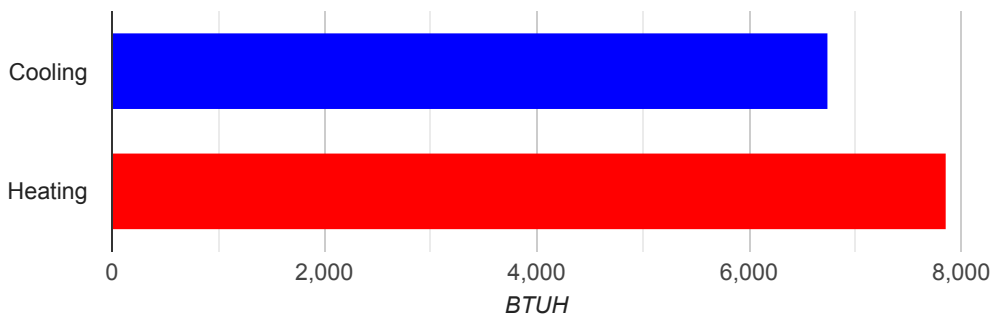


ROOM DETAIL

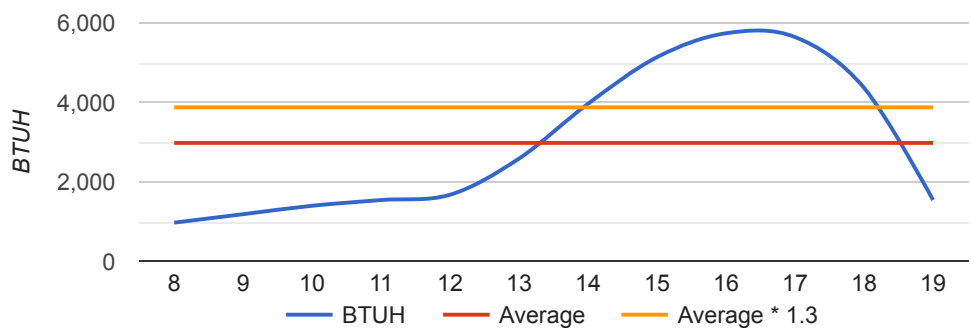
Room name: Den, closet, bathroom

| | | | |
|---------------------------------|-------|---------------------|-------|
| Heated square footage: | 441 | Total Cooling BTUH: | 6,732 |
| Cooled square footage: | 441 | Total Heating BTUH: | 7,848 |
| Heated volume (above grade CF): | 5,292 | CFM: | 330 |
| Cooled volume (above grade CF): | 5,292 | | |
| Exposed wall area (SF): | 370 | | |

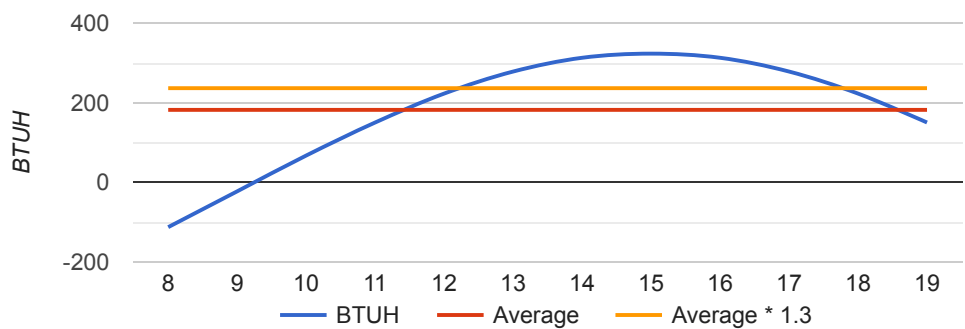
Load Calculation



AED Graph (mid-summer)



AED graph (fall)



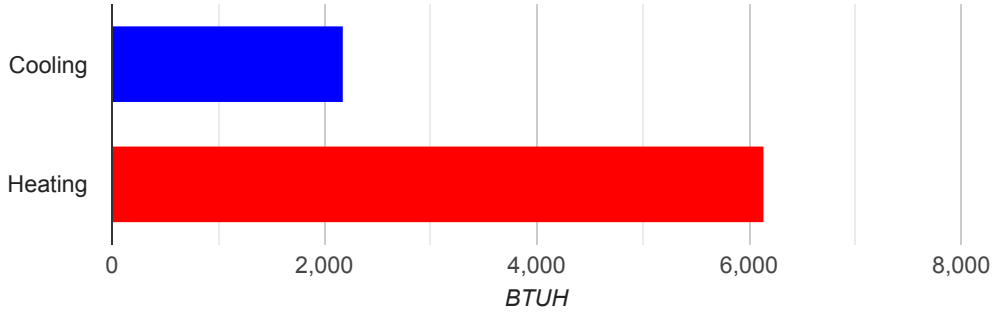
ROOM DETAIL

Room name: Large BR

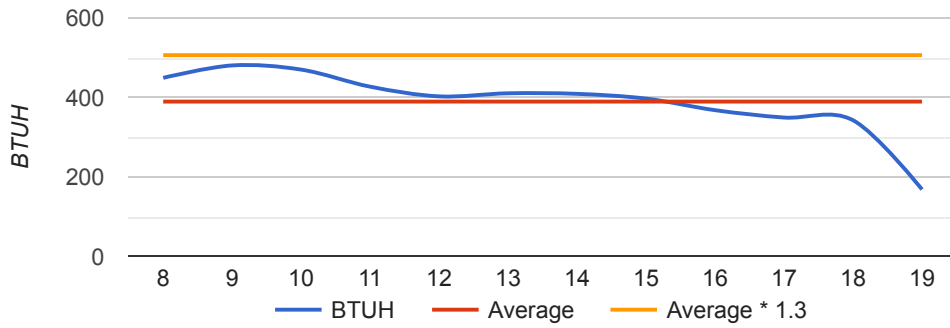
Heated square footage: 234
Cooled square footage: 234
Heated volume (above grade CF): 2,340
Cooled volume (above grade CF): 2,340
Exposed wall area (SF): 440

Total Cooling BTUH: 2,175
Total Heating BTUH: 6,146
CFM: 98

Load Calculation



AED Graph (mid-summer)



AED graph (fall)

