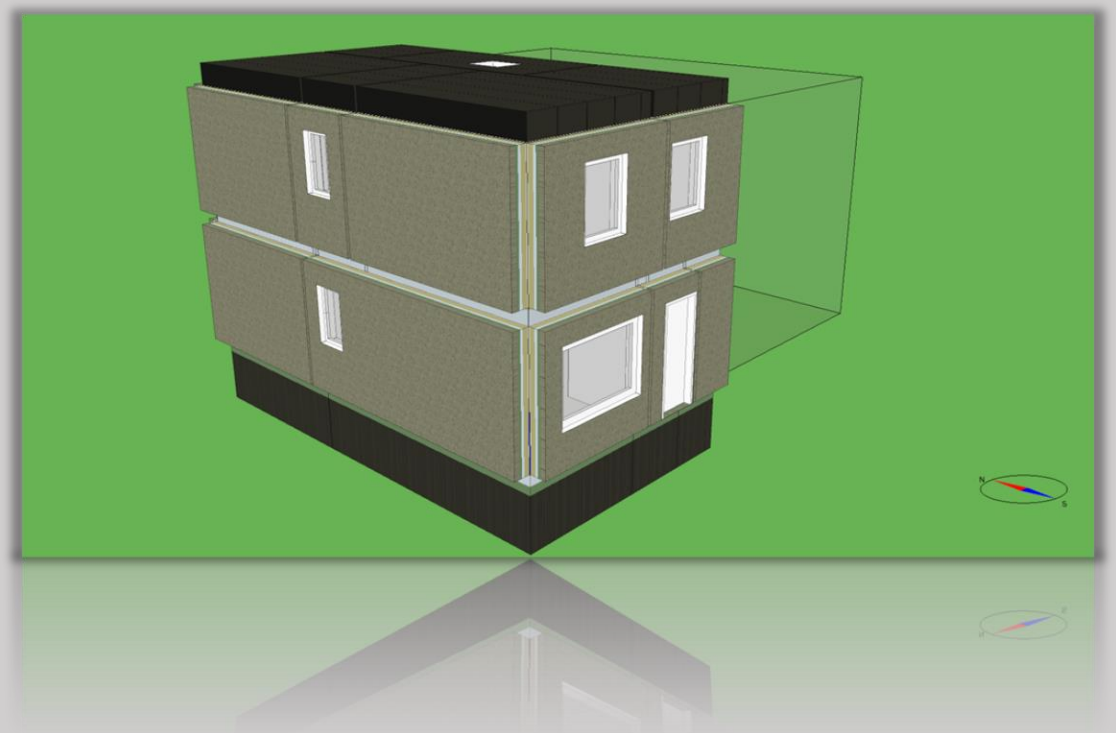


GENIO BAUPHYSIK

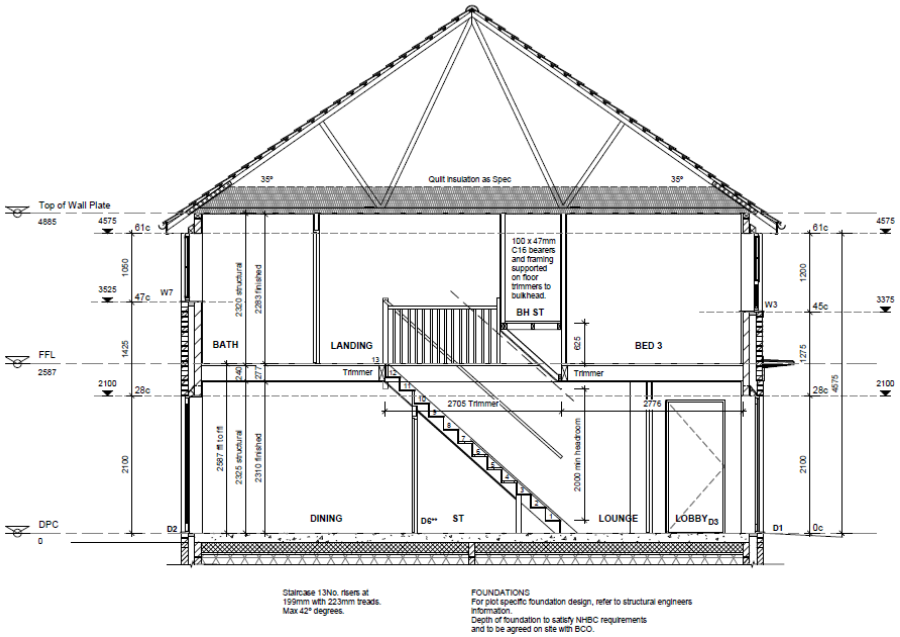
# HEAT4ALL: MAIDSTONE CLASSIC/LEICESTER

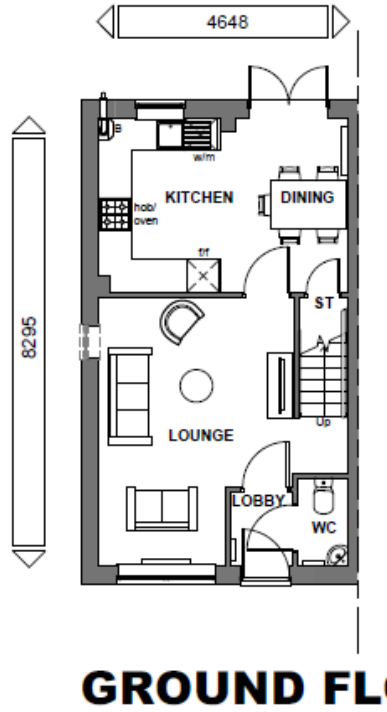
## Estimation of Building Heating Load & Heating Demand

23.07.2020

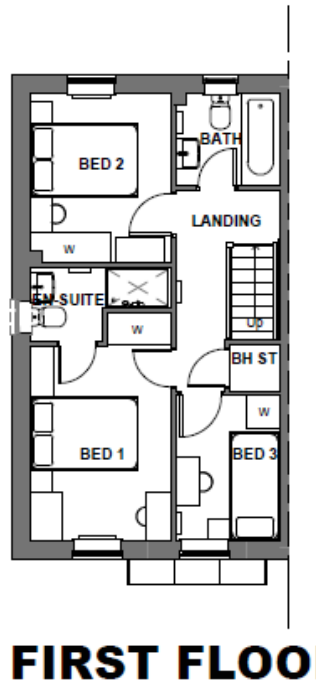
# GOAL & SCOPE

- Estimation of building heating demand and heating load for a residential building in Leicester (UK).
- Project: Maidstone Classic / Leicester




GROUND FLOOR




FIRST FLOOR

# DATA & CALCULATION ASSUMPTIONS

- Geometry
  - building plan (email 15.07.2020)
- Constructions & materials data
  - building plan & provided data (email 15.07.2020)
  - missing data estimated
- Thermal bridges
  - estimated
- Room air temperature:
  - $T_i = 20$ [°C]
- Air change rate
  - ACH = 0,4 [1/h]
- Internal gains
  - $q_i = 3{,}75$ [W/m²]

# CLIMATE DATA

- ASHRAE IWEC2 weather file
  - Leicester/Peterborough/Cottesmore (UK)
  - Data from ASHRAE Fundamentals 2013

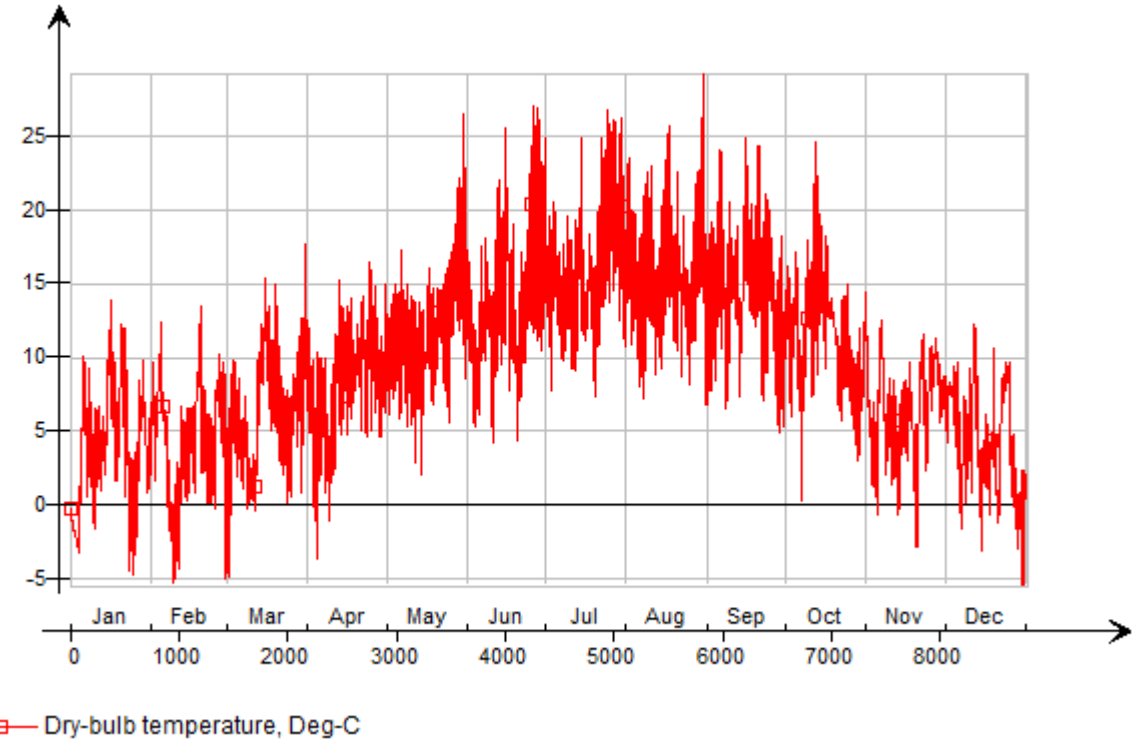
**Design day data**

**Design data file**

ASHRAE 2013\034530.tbl

User-defined design days

| | | Winter | Summer | |
|---|---|---|---|---|
| Dry-bulb min | | -4.3 | 14.1 | °C |
| Dry-bulb max | | 0.3 | 26.0 | °C |
| Wet-bulb max | | -0.2 | 17.6 | °C |
| Wind direction | | 270 | 210 | ° |
| Wind speed | | 3.1 | 5.6 | m/s |
| Clear-sky optical depth | tau_b | 0.331 | 0.39 | |
| | tau_d | 2.533 | 2.261 | |



# THERMAL CONDUCTANCE

| Fixed infiltration airflow rate | | | 19.261 l/s | |
|---|---|---|---|---|
| **Building envelope** | **Area [m²]** | **U [W/(m² K)]** | **U*A [W/K]** | **% of total** |
| **Walls above ground** | **66.19** | **0.31** | **20.77** | **28.73** |
| ExternalWall | 66.19 | 0.31 | 20.77 | 28.73 |
| **Walls below ground** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Roof** | **37.00** | **0.11** | **3.98** | **5.50** |
| Roof | 37.00 | 0.11 | 3.98 | 5.50 |
| **Floor towards ground** | **38.81** | **0.13** | **5.07** | **7.01** |
| Ground Floor | 38.81 | 0.13 | 5.07 | 7.01 |
| **Floor towards amb. air** | **0.00** | **0.00** | **0.00** | **0.00** |
| **Windows** | **12.47** | **1.41** | **17.58** | **24.32** |
| Glazing | 12.47 | 1.41 | 17.58 | 24.32 |
| **Doors** | **1.69** | **1.98** | **3.34** | **4.62** |
| Entrance door1 | 1.69 | 1.98 | 3.34 | 4.62 |
| **Thermal bridges** | | | **21.57** | **29.83** |
| **Total** | **156.16** | **0.46** | **72.31** | **100.00** |

# HEATING LOAD

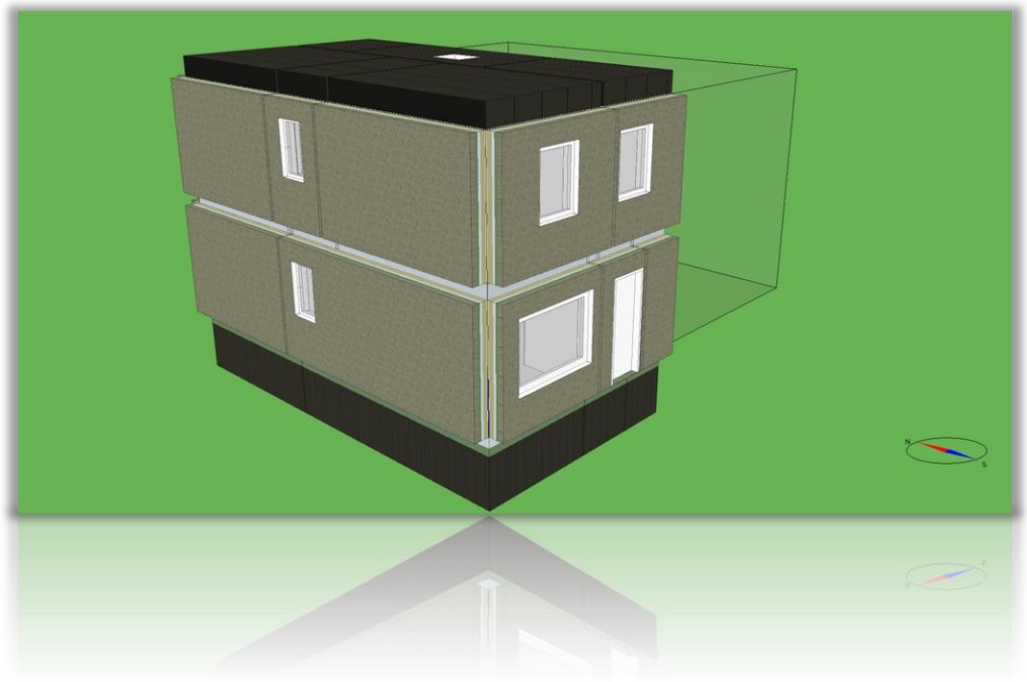
| | Heating load [W] | Heat4All Infrared panel | Nominal output [W] |
|---|---|---|---|
| WC | | SmartLine 175 | 175 |
| Lounge | | SmartLine 1000 | 1000 |
| Kitchen | | SmartLine 1000 | 1000 |
| Bed1 | | SmartLine 520 | 520 |
| En-Suit | | SmartLine 320 | 320 |
| Bed2 | | SmartLine 520 | 520 |
| Bed3 | | SmartLine 320 | 320 |
| Landing | | SmartLine 175 | 175 |
| Bath | | SmartLine 320 | 320 |
| Lobby | | SmartLine 175 | 175 |
| **Total** | **2 286** | | **4 525** |

# BUILDING HEATING DEMAND

| | Envelope & Thermal bridges, kWh | Internal Walls and Masses, kWh | Window & Solar, kWh | Infiltration & Openings, kWh | Internal gains, kWh | Local heating units, kWh |
|---|---|---|---|---|---|---|
| During heating | -4 095 | 184 | -360 | -1 917 | 1 700 | 4 482 |
| | | | | | | |
| | £0.134 | per kWh | | | | £600.57 |
| | £0.195 | daily charge | | | | £71.18 |
| Electricity (for room heating) | | | | | | £671.75 |

# NOTE

- The presented figures are a based on a simplified non-standard estimate of the building heating demand and heating load. Deviating actual conditions (climate, user behavior, control settings, ventilation, building orientation, insulation,…) may cause significant deviation from the calculated results.



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