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IGBC
MEMBER | 2022

Project: Scholarstown Residential Development

Report Title: Energy Statement

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EXECUTIVE SUMMARY

This document sets out how the proposed apartment development in Scholarstown will integrate sustainable design principles and strategies. In addition, the report confirms the energy performance targets, as set out within Technical Guidance Document L – Conservation of Fuel and Energy – Dwellings 2021.

A preliminary analysis has been carried out to inform the design strategy and demonstrate compliance with the Building Regulations Part L to ensure that the targeted Building Energy Rating (BER) of A2-A3 will be achieved.

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1. INTRODUCTION

This Energy Statement prepared by Passive Dynamics Sustainability Consultants forms part of the planning submission documentation for the proposed residential development. The development consists of ;

a) The demolition of the existing modern shed structures on site, the retention and conversion of Scholarstown House into two no. units comprised of 1 no. 2-bed and 1 no. 3-bed units, and the construction of a 5-storey apartment block containing 74 no. apartment units comprised of 32 no. 1-bed apartments, 33 no. 2-bed apartments, and 9 no. 3-bed apartments all served by private open space in the form of balconies and/or ground floor terraces.

b) 71.06 sq.m of residential amenities and facilities are proposed in the apartment block including but not limited to a reception, communal amenity room and parcel room.

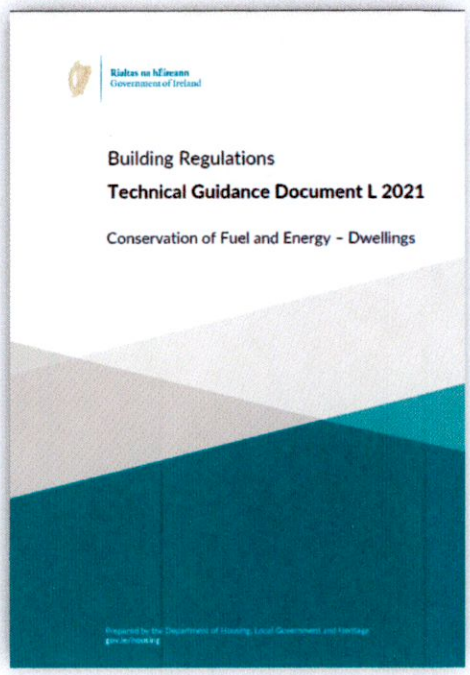
c) The development will be served by a total of 36 no. car parking spaces including 7 no. EV parking spaces and 177 no. cycle parking spaces accessed via a new pedestrian and

vehicular access off Orlagh Grove.

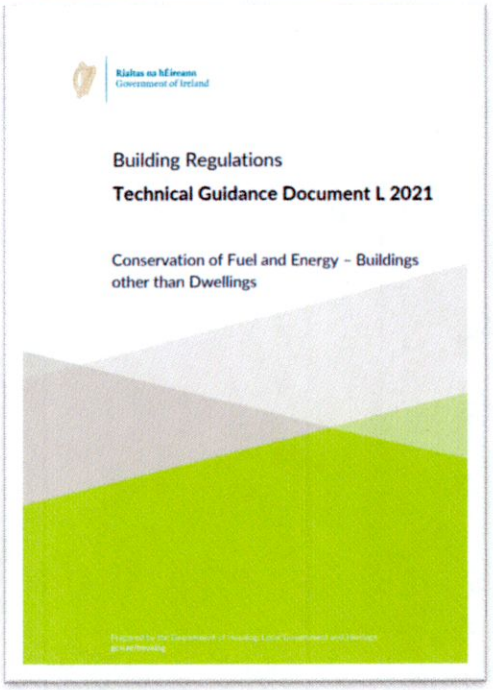
d) The development will also consist of all ancillary development works required to facilitate the development including but not limited to, internal works to Scholarstown House, plant rooms, a substation, bin stores, landscaping, boundary treatments, PV panels and lighting.

2. GUIDANCE DOCUMENTS REFERENCED

This Energy Statement has been carried out following the following best practice standards and reference documents:

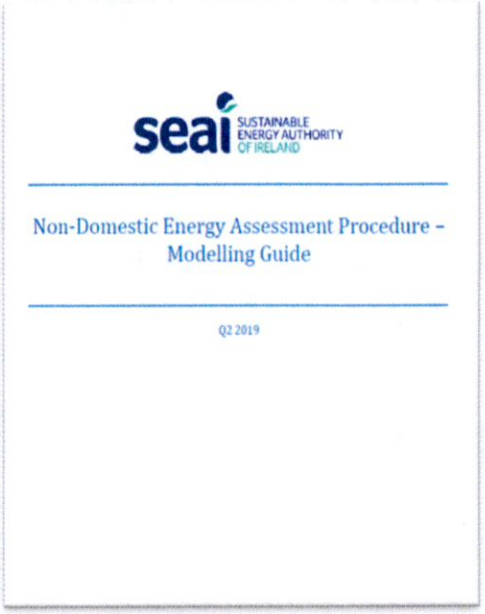


Part L 2021 Domestic

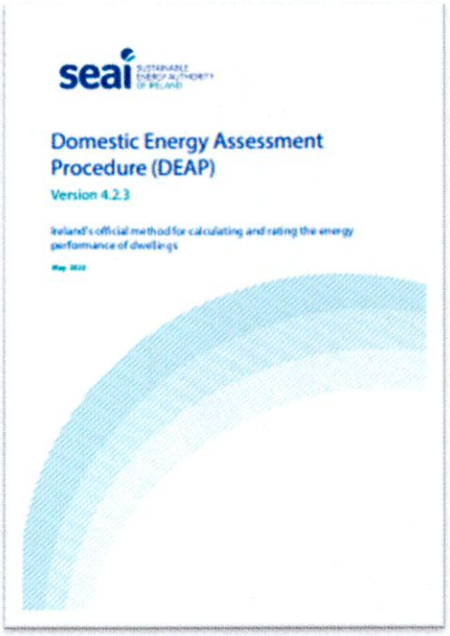


Part L 2021 Non-Domestic

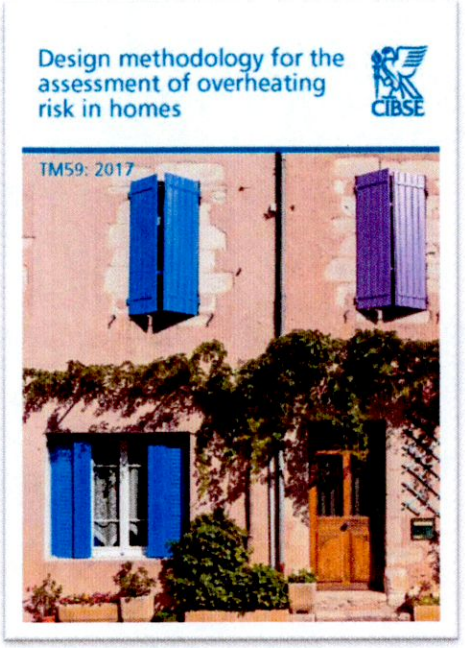
South Dublin County Council Development Plan 2022-2028



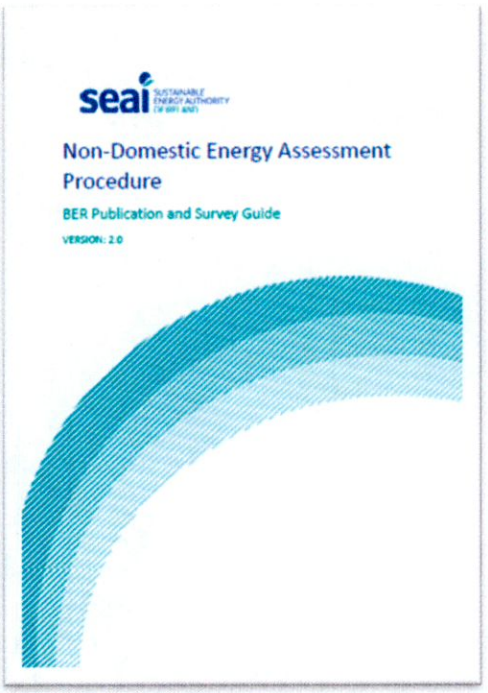
NEAP Modelling Guide



DEAP Version 4.2.3



CIBSE TM 59



NEAP Version 2.0

3. SITE LOCATION & DEVELOPMENT SUMMARY

The proposed development at Scholarstown consists of 71.06 sq.m of residential amenities and facilities are proposed in the apartment block including but not limited to a reception, communal amenity room and parcel room.

The development will be served by a total of 36 no. car parking spaces including 7 no. EV parking spaces and 177 no. cycle parking spaces accessed via a new pedestrian and vehicular access off Orlagh Grove.

The development will also consist of all ancillary development works required to facilitate the development including but not limited to, internal works to Scholarstown House, plant rooms, a substation, bin stores, landscaping, boundary treatments, PV panels and lighting.

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4. LEGISLATIVE & PLANNING REQUIREMENTS

4.1. Part L 2021 – Conservation of Fuel and Energy – Dwellings

This document is the current standard for new dwellings and was released in November 2021. This document ensures that new homes achieve nearly zero energy building performance, as stated in Article 4 (1) of the Directive for new buildings. Nearly Zero Energy Buildings can be defined as:

> *"Nearly zero-energy building means a building has a very high energy performance, as defined in Annex 1. The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby".*

The aim is to limit the amount of energy required for the operation of the building and the amount of carbon dioxide (CO2) emissions associated with this energy use insofar as is reasonably practicable. For new dwellings, the nearly zero energy performance requirements of this regulation shall be met by:

1. Providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO2) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably practicable when both energy consumption and carbon dioxide (CO2) emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Authority of Ireland.
2. Providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.
3. Limiting the heat loss and, where appropriate, availing of heat gain through the fabric of the building.
4. Providing and commissioning energy-efficient space and water heating systems with efficient heat sources and effective controls.
5. Providing to the dwelling owner sufficient information about the building, the fixed building services, controls, and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

6. A new building shall, where technically and economically feasible, be equipped with self-regulating devices for the separate regulation of the temperature in each room or, where justified, in a designated heated zone of the building unit.
7. Where a heat generator is being replaced in an existing building, where technically and economically feasible, self-regulating devices shall also be installed.
8. A building (containing one, or more than one, dwelling), which has more than 10 car parking spaces, that is:

   (i) new; or

   (ii) subject to subparagraph undergoing major renovation, shall have installed ducting infrastructure (consisting of conduits for electric cables) for each car parking space to enable the subsequent installation of recharging points for electric vehicles.
9. The requirement of subparagraph (f) shall apply to a building undergoing major renovation where:

   (i) in a case where the car park is located inside the building, the renovations concerned include the car park or the electrical infrastructure of the building; or

   (ii) in a case where the car park is physically adjacent to the building, the renovations concerned include the car park or the electrical infrastructure of the car park.

5. South Dublin Development Plan 2022 - 2028

The development is subject to the South Dublin development plant 2022-2028 The following council policies have been considered as part of the proposed Energy strategy: The '2021 Climate Action Plan' represents the Government's all of society approach, aimed at enabling Ireland to meet the EU targets to reduce carbon emissions by 51 per cent between 2021 and 2030, and lays the foundations for achieving net zero carbon emissions by 2050. Within that context South Dublin County Council through its strategic County Development Plan seeks to exceed those targets or meet them earlier, creating reliable, robust and efficient energy systems which enable growth across all sectors, and which supports the future development of the County. In line with the LGMAs Delivering on Climate Action 2030, the Council will continue to make every effort to increase energy efficiency and unlock renewable energy potential in the County

5.1. Renewable Energy Projects - Housing

Healthy Placemaking and Climate Action Housing should be delivered in a manner which facilitates the needs of a diverse range of people, providing a balance in terms of unit mix and tenure types. The design, function and layout of housing schemes, when done well, contributes significantly towards the delivery of healthy placemaking. Locating new housing in the right location ensures ease of movement by active modes to existing amenities, services and places of work. This facilitates a move away from car-based and unsustainable travel patterns thereby reducing emissions. Housing layout and design considerations can also contribute positively towards climate adaptation by ensuring new development is sited away from areas at risk of flooding, while the design, orientation and building materials used can ensure energy efficient homes are delivered.

5.2. Climate Change

The following information from the South Dublin County Council Development plan 2022-2028 outlines the climate change guidance

5.3. Policy E2: South Dublin Energy Profile

Further develop and implement climate action and energy related initiatives in the County in conjunction with EMRA, the Dublin Energy Agency (Codema), Climate Action Regional Office (CARO) and all relevant stakeholders, promoting energy efficiency and renewable energy measures across the County

E2 Objective 1
To seek to reduce the reliance on fossil fuels in the County by reducing the energy demand of existing and new development.

E2 Objective 2
To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment. SOUTH DUBLIN COUNTY DEVELOPMENT PLAN 2022-2028 385 Energy (E)

E2 Objective 3
To support the recording and monitoring of renewable energy potential in the County in partnership with other stakeholders including the East Midlands Regional Assembly EMRA, the Dublin Energy Agency (Codema), Climate Action Regional Office (CARO).

5.4. Energy

To support new and existing Sustainable Energy Communities (SECs) in line with sustainable development and proper planning.

E3 Objective 1
To reduce the need for energy, enhance energy efficiency and secure the use of renewable energy sources in refurbished and upgraded dwellings, and other buildings through the design and location of new development, in accordance with relevant building regulations and national policy and guidance.

E3 Objective 2
To prioritise the retrofitting of buildings over demolition and reconstruction where possible to reduce the large quantities of embodied carbon energy generated from building materials when building from the ground up.

E3 Objective 3
To require all new development to be designed to take account of the impacts of climate change, and that energy efficiency, energy provision and renewable energy measures are incorporated in accordance with national building regulations and relevant policy and guidelines.

E2 Objective 4
To support and facilitate the actions and targets of the National and South Dublin Climate Action Plans where they relate to private and public buildings in the County

5.5. Electric Vehicles

E4 Objective 1
To support the implementation of the EV charging strategy for the Dublin Region.

E4 Objective 2
To ensure that EV charging points are installed such that they do not cause significant obstruction to lower carbon forms of transportation (that is, footpaths, cycle lanes, access to DART or Luas stations, or bus lanes / stops).

E4 Objective 3
To ensure that all new vehicles purchased or replaced in the Council's fleet are EVs charged from renewable sources or powered by renewable fuels.

5.6. Policy E7: Solar Energy

Promote the development of solar energy infrastructure in the County, including the building of integrated and commercial-scale solar projects subject to a viability assessment and environmental safeguards including the protection of natural or built heritage features, biodiversity and views and prospects.

E7 Objective 1
To encourage and support the development of solar energy infrastructure for on-site energy use at appropriate locations in the County.

E7 Objective 2
To encourage and support the development of commercial-utility solar energy infrastructure for local distribution at suitable locations in the County.

E7 Objective 3
To support and encourage the ongoing delivery of solar technology on Council owned buildings and sites in accordance with the South Dublin Climate Action Plan.

E7 Objective 4
To explore the potential for the development of solar PV Strategic Energy Zones in the County in accordance with the requirements of RPO 7.35.

E7 Objective 5
To ensure that planning applications for solar energy infrastructure which may impact on the operation of airports are referred to the IAA / Department of Defence or relevant airport authority.

E7 Objective 6
To establish a GIS database of PV installations in the County at the appropriate time in tandem with the roll out of solar PV development. This should include data on the size (area of site in m2, total area of panels per m2), type (monocrystalline, tracking, PV, concentrated solar panels, domestic / commercial, etc.), grid connection details (location, kV, two-way metering, etc.) and energy generation (kW peak, annual kWh) of each installation.

E7 Objective 7
To support the provision of solar farms in the County in areas zoned RU subject to protecting environmental sensitivities.

E7 Objective 8
To support the installation of solar panels on up to 100% of residential roof space.

5.7. Policy E12: Decarbonising Zones

Support the identification and development of decarbonisation zones in South Dublin over the lifetime of the Development Plan.

E12 Objective 1
To promote the generation and supply of low carbon and renewable energy alternatives.

E12 Objective 2
To work with stakeholders to advance and implement decarbonisation zones in the County.

E12 Objective 3
To ensure that all developments within the decarbonising zone commit to the aims of those zones in areas where they are identified within the County.

6. ENERGY STRATEGY & BRIEF

The design approach adopted for the development will be the **LEAN, CLEAN, GREEN** Approach.

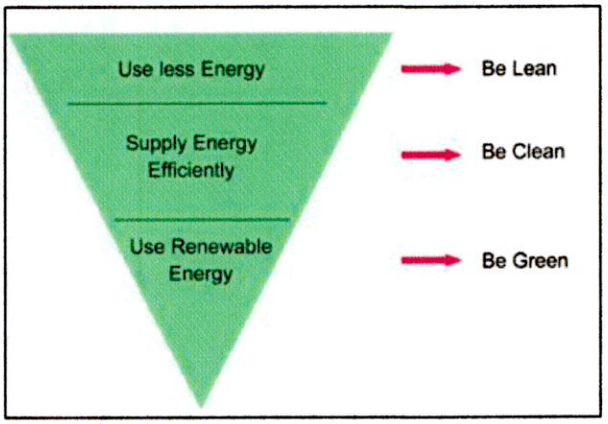

FIGURE 1 ENERGY STRATEGY

Passive Dynamics considers this hierarchy, now endorsed by many local authorities, to be well-considered and an appropriate set of principles to tackle climate change. In adopting this hierarchy, the Energy and CO_2 performance are maximized before strategies at the next stage are considered.

Lean

The design intends to reduce the demand for energy by designing efficiency into the very fabric of the proposed development. This focus will extend to airtightness, thermal bridges, and solar control, as well as considering the thermal mass.

Clean

In specifying mechanical and electrical services for the proposed development, the design intends to use "Best in Class" technology systems and the most efficient in their range. Consideration will be given to both the embodied energy and the energy consumed over its lifespan within the building. This is relevant to the heating system, hot water generation, ventilation system, and lighting. The design team will also focus on controlling and meeting these energy end uses, greatly assisting future energy measurement and verification activities.

Green

Implement renewable technologies (where feasible) to a higher degree due to the significantly reduced energy requirements of the building.

Adopting this approach ensures that where renewable technologies are considered, they are sized efficiently and not based on excessive over-sized plant loads. Thus, this approach helps to develop a more cost-efficient renewable solution.

A feasibility assessment will be carried out to determine the practical, economic, and environmental benefits of such technologies for this development at the detailed design stage. Renewable technologies that will be considered during the design stage include Photovoltaic Panels, Air Source Heat Pumps, and Exhaust air heat pumps.

6.1. Fabric Performance

To conserve energy and prevent heat loss from occupied zones, care and attention will be given to the performance of the fabric of the development. The table below sets out the design U-Values that will be achieved:

Construction Element U Value Performance	
Fabric Elements	(W/m^2K)
Roof	0.18
Walls	0.16
Floor	0.18
Glazing	1.20
External doors	1.20
Glazing Properties	
G-Value	0.55
Light Transmittance (VLT)	0.63

6.2. Natural Ventilation

Natural Ventilation will be incorporated wherever possible via either single-sided or cross ventilation. However, where natural ventilation cannot provide the comfort and air quality of the occupants or the space and mechanical ventilation cannot be avoided, these systems will incorporate energy-efficient solutions to maximize the systems' efficiency using heat recovery. This will be assessed during detailed design following procedures in CIBSE TM59- "Design methodology for assessing overheating risk in homes."

For dwellings that incorporate mechanical solutions, it should be noted that these systems will not be sufficient to prevent summertime overheating alone. CIBSE TM59 states that "Homes that are predominantly naturally ventilated, including homes that have mechanical ventilation with heat recovery (MVHR), with good opportunities for natural ventilation in the summer should assess overheating using the adaptive method." This will involve detailed consideration of openable windows and doors and testing the design for several typical worst-case apartments using dynamic simulation.

6.3. Air Tightness

In addition to fabric heat loss/gain, care will be taken during the design and construction to limit the air permeability (or Infiltration). High levels of Infiltration can contribute to uncontrolled ventilation. The performance target for the air permeability rate of $3m^3/hr/m^2$ @ 50 Pa.

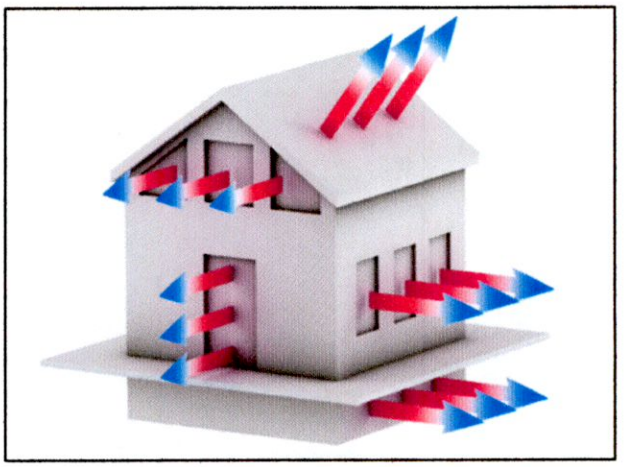

FIGURE 2 AIR TIGHTNESS

6.4. Thermal Transmittance

To avoid excessive heat losses and local condensation problems, consideration will be given to ensure insulation continuity and limit local thermal bridging, e.g., around windows, doors, and other wall openings, at junctions between elements, and other locations. Heat loss associated with thermal bridging is considered when calculating energy use and CO2 emissions using the DEAP / NEAP methodology. A thermal bridge value of 0.08 W/m^2K will be implemented; key junctions will meet ACAD standards.

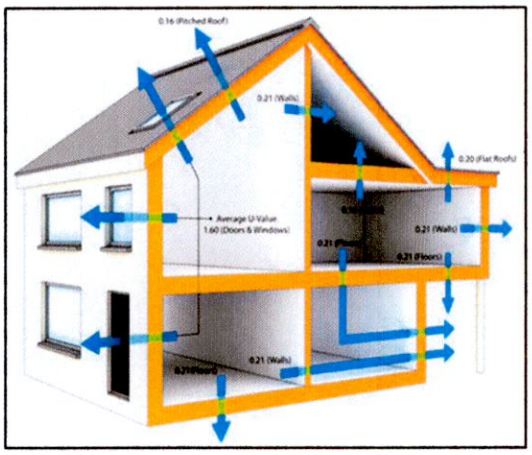

FIGURE 3 THERMAL TRANSMITTANCE

6.5. Overheating Analysis

As the performance of buildings is improving, in terms of airtightness and fabric performance, this has increased the possibility of overheating. Therefore, in line with the Part L 2021 regulations, a CIBSE TM59 study will be carried out to ensure thermal comfort for occupants is achieved.

6.6. Heating & Domestic Hot Water Strategy

The proposed heating for the apartments is an exhaust air to a water heat pump, combined with radiators. This system uses waste heat from warm air areas of your house, e.g., Bathrooms, kitchen, and utility, and transfers that heat to hot water by applying the same principles as air source and ground source heat pumps. Installing an Exhaust Air Heat Pump within each apartment will achieve a BER of A2 / A3 and meet the Part L renewable requirements. In addition, air-source heat pumps will be installed within the houses.

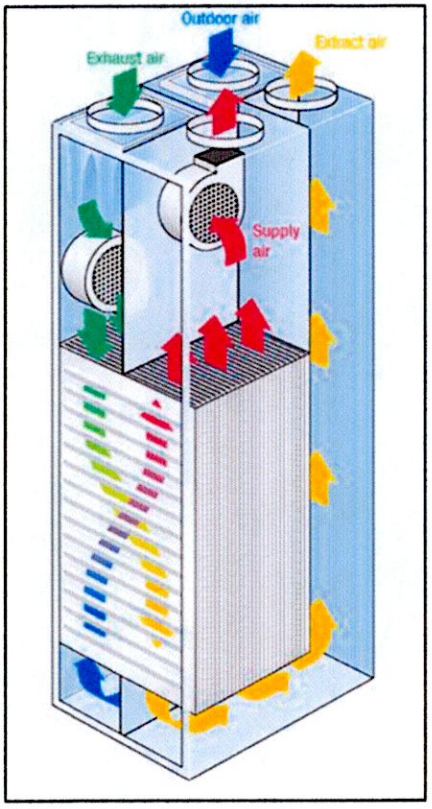

FIGURE 4 EXHAUST AIR SOURCE HEAT PUMP

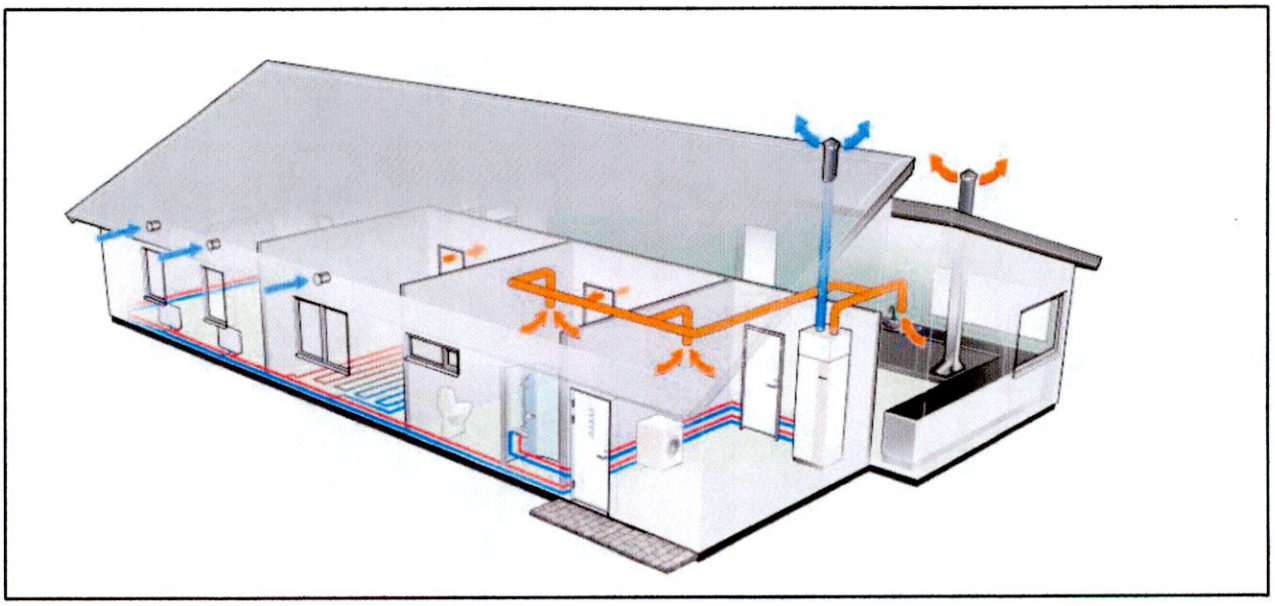

FIGURE 5 EXHAUST AIR HEAT PUMP

The house heating system applied to the review was an Air source heat pump; this technology exploits seasonal temperature differences between external air and refrigerant temperatures to provide heating and hot water services.

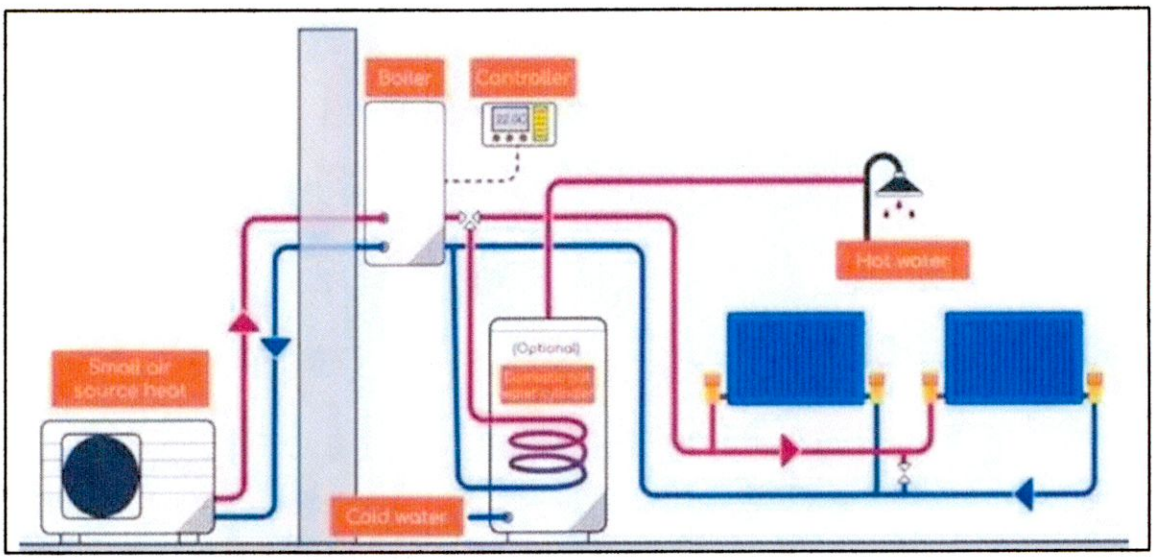

FIGURE 6 AIR SOURCE HEAT PUMP

6.7. Ventilation

The proposed system applies mechanical ventilation with heat recovery (MVHR), a whole-house ventilation system that generally supplies fresh air to dry rooms and extracts stale air from wet rooms. Both airflows are to be ducted a driven by two fans, one on the supply side and one on the extract side. This will provide whole-building ventilation as the mechanical extract fan will remove odours and control humidity to maintain a high level of air quality. A vital component is that the heat recovery unit transfers heat from the warm exhaust air to the fresh air, achieving heat recovery.

The system will be commissioned with two dedicated extract flow rates for the unit, one for background ventilation and one for boost ventilation. A boost function will be activated by a drop in air or water temperature and raise the volume flow rate to a maximum pre-set value. In addition, passive wall inlet vents are required in all habitable rooms to make up the air extracted by the EAHP.

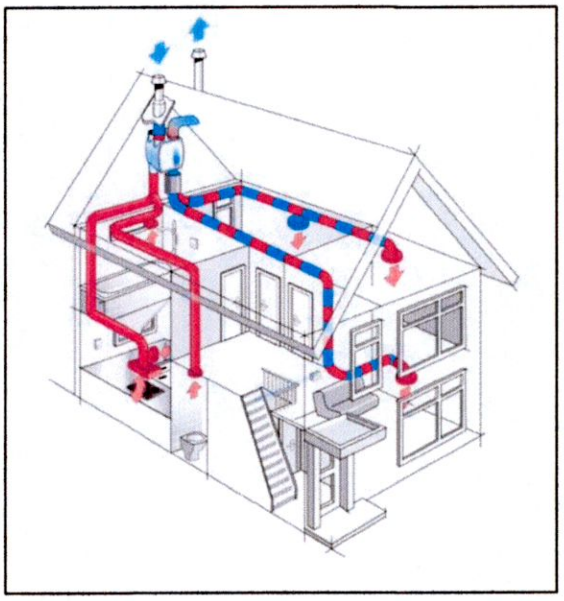

FIGURE 7 HEAT RECOVERY

6.8. Lighting

Low-energy LED lighting will be installed throughout the development. LED is a highly energy-efficient technology and can fundamentally change the future of lighting. LED lighting, especially ENERGY STAR-rated products, use at least 75% less energy and last 25 times longer than incandescent lighting.

6.9. Water Efficiency

During the detailed design stage for the proposed development, potable water consumption in sanitary applications will be strongly considered. Therefore, where possible, low water use fittings and dual flush WC's will be specified.

A rainwater harvesting system will also be considered for this project. During the detailed design stage, calculations will be carried out to evaluate the suitability of this type of system. Reclaimed rainwater can be used for a range of applications such as toilet flushing, washing machines, and irrigation. There are three main types of rainwater recovery systems: indirectly pumped, directly pumped, and gravity fed. The benefits of rainwater harvesting are twofold as not only does it help to reduce the use of treated mains water for non-potable use, but it can also help reduce water run-off and risk of flooding.

6.10. PV Panels

The option of installing Photovoltaic panels will be reviewed to comply with renewable energy contributions for the landlord areas.

FIGURE 8 SOLAR PANEL

7. SUMMARY

The design team has adopted an integrative design process for this project, which has resulted in a proposed design with several sustainable and low-energy strategies being applied.

The proposed development will meet the highest sustainable design and construction standards according to all applicable regulations and planning requirements. Where feasible, the development will aspire to exceed these requirements. In line with the South Dublin County Council Development Plan 2022-2028, the following sustainability considerations will be inherently addressed during design and construction to ensure the overall development:

- Makes efficient use of land.
- Reduces carbon dioxide and other emissions that contribute to climate change.
- Minimizes energy use, including passive solar design, natural ventilation, vegetation (green roofs, etc.).
- Minimises energy use, including passive solar design and natural ventilation.
- Supplies energy efficiently and incorporates decentralised energy systems such as District Heating and uses renewable energy where feasible.
- Manages flood risk, including applying sustainable drainage systems (Suds) and flood resilient design for infrastructure and property.
- Reduces air and water pollution.
- Is comfortable and secure for its users.
- Avoids the creation of adverse local climatic conditions.
- Promotes sustainable waste behaviour. Reduces adverse noise impacts, internally and externally.

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8. APPENDIX A – Sample DEAP Assessments

8.1. Sample DEAP Assessment Inputs

Apartment Inputs– Exhaust air heat pumps were applied to the heating and domestic hot water.	
Elements	**Input**
Roof	0.18 W/m²K
Walls	0.16 W/m²K
Floor	0.18 W/m²K
Glazing	1.20 W/m²K
External doors	1.20 W/m²K
Glazing Properties	
Type	Double Glazed Wood/PVC – 12mm gap
Frame Factor	0.70
Solar Energy Transmittance	0.63
Thermal Bridging	
Thermal Bridging	0.08 W/m²K
Heating System	
Heating System	NIBE exhaust air heat pump – F730
Controls	Time & Temperature Zone Control
Circulation Pump Power Consumption	29 (Kwh/yr)
Pump Controls	Controlled by Room Stat
Pump Location	Inside Dwelling
Design Flow Temperature	45°C
Running Hours	24 hours
Heat Emitter Type	Radiators
Space Heating Efficiency	132%
Water Heating Efficiency	110%
Ventilation	
Air Permeability	0.15 ac/hr
Type	Exhaust air heat pump
Specific Fan Power	0.26 W/l/s
Exhaust air flow rate	Default based on floor area
Fans & Vents	3 x Intermittent Fans
Showers & Baths	
Bath	1
Showers	2 x Unvented Mixer
Flow restrictors	Yes – 6 l/min
Lighting	
Lighting type	LED lighting 66.90 lm/w
Renewables	
Solar Thermal	No
Solar PV	No

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9. DEAP Summary of Results

Dwelling Results – Scholarstown Schedule of Sample BERs						
Apartment Number / Floor	Area (m^2)	BER Rating	EPC	CPC	RER	Compliance Achieved
Apt 01 – Ground Floor	82.2	A3	0.282	0.27	31.5%	✓
Apt 07 – Ground Floor	50.19	A3	0.297	0.288	35.2%	✓
Apt 12 – Ground Floor	98.18	A2	0.291	0.279	29.2%	✓
Apt 101 – First Floor	46.1	A3	0.297	0.287	31.6%	✓
Apt 104 – First Floor	88.56	A2	0.282	0.271	23.1%	✓
Apt 111 – First Floor	100.04	A2	0.287	0.278	30.2%	✓
Apt 209 – Second Floor	87.87	A2	0.287	0.279	29.4%	✓
Apt 218 – Second Floor	81.51	A2	0.291	0.282	30.8%	✓
Apt 220 – Second Floor	50.19	A3	0.299	0.229	31.8%	✓
Apt 305 – Third Floor	55.8	A2	0.299	0.294	32.0%	✓
Apt 312 – Third Floor	63	A3	0.297	0.285	32.4%	✓
Apt 316 – Third Floor	80	A3	0.295	0.285	31.0%	✓
Apt 402 – Fourth Floor	88.55	A2	0.272	0.261	30.8%	✓
Apt 405 – Fourth Floor	54.57	A3	0.282	0.272	34.3%	✓

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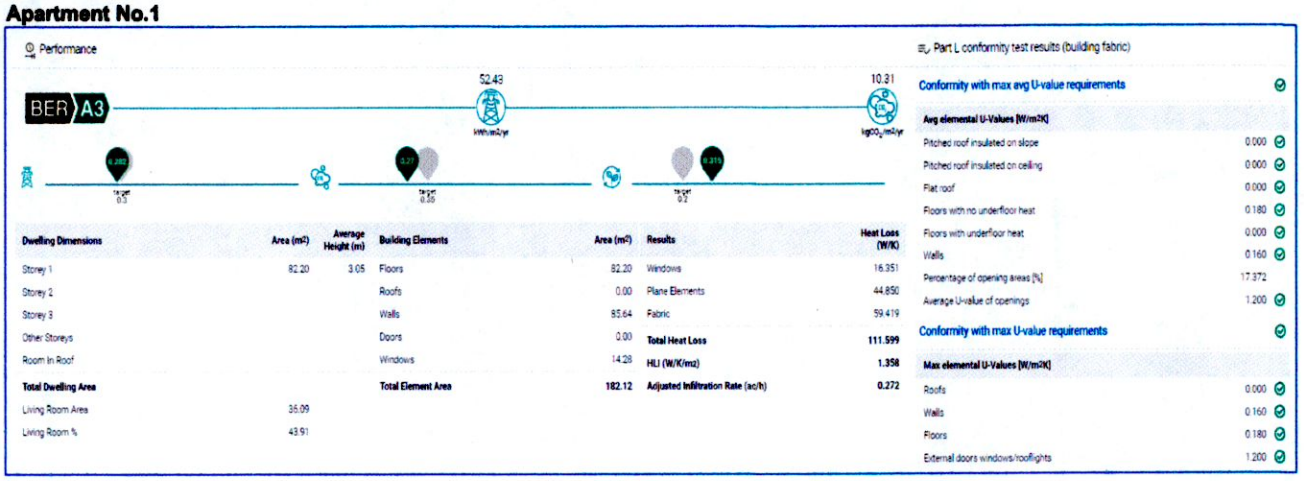
9.1. Sample DEAP Results

Apartment No.1



Performance

BER A3

52.43 kWh/m2/yr

10.31 kgCO2/m2/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	82.20	3.05
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	36.09	
Living Room %	43.91	

Building Elements	Area (m²)
Floors	82.20
Roofs	0.00
Walls	85.64
Doors	0.00
Windows	14.28
Total Element Area	**182.12**

Results	Heat Loss (W/K)
Windows	16.351
Plane Elements	44.850
Fabric	59.419
Total Heat Loss	**111.599**
HLI (W/K/m2)	**1.358**
Adjusted Infiltration Rate (ac/h)	**0.272**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

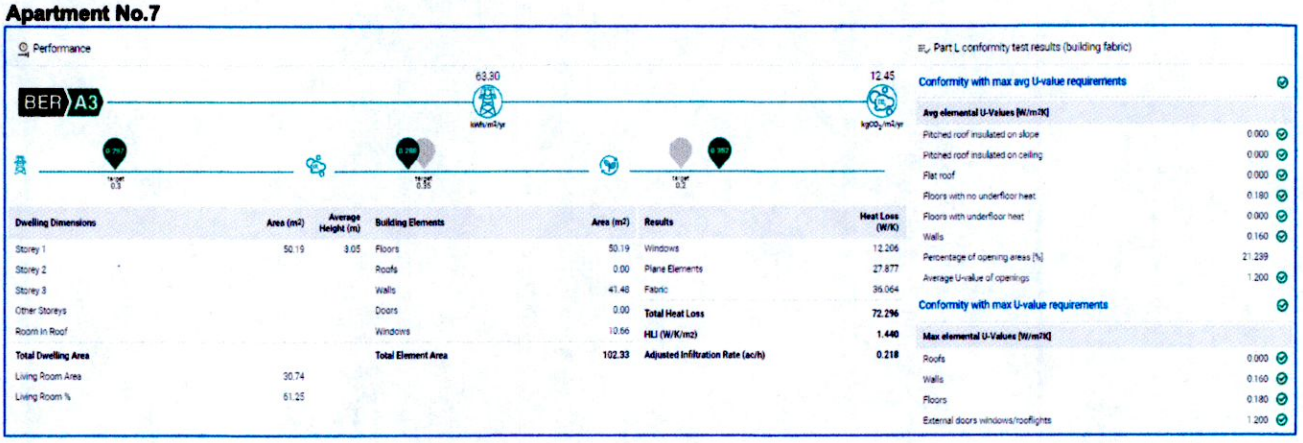
Avg elemental U-Values [W/m²K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.180
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	17.372
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m²K]	
Roofs	0.000
Walls	0.160
Floors	0.180
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.7



Performance

BER A3

63.30

12.45

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	50.19	3.05
Storey 2		
Storey 3		
Other Storeys		
Room in Roof		
Total Dwelling Area		
Living Room Area	30.74	
Living Room %	61.25	

Building Elements	Area (m²)
Floors	50.19
Roofs	0.00
Walls	41.48
Doors	0.00
Windows	10.66
Total Element Area	**102.33**

Results	Heat Loss (W/K)
Windows	12.206
Plane Elements	27.877
Fabric	36.064
Total Heat Loss	**72.296**
HLI (W/K/m2)	**1.440**
Adjusted Infiltration Rate (ac/h)	**0.218**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.180
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	21.239
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.000
Walls	0.160
Floors	0.180
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.12

Performance

BER A2

48.81 kWh/m2/yr

9.60 kgCO2/m2/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	98.18	3.05
Storey 2		
Storey 3		
Other Storeys		
Room in Roof		
Total Dwelling Area		
Living Room Area	31.97	
Living Room %	32.56	

Building Elements	Area (m²)
Floors	98.18
Roofs	0.00
Walls	70.90
Doors	0.00
Windows	24.87
Total Element Area	**193.95**

Results	Heat Loss (W/K)
Windows	28.477
Plane Elements	57.493
Fabric	73.009
Total Heat Loss	**131.224**
HLI (W/K/m2)	**1.337**
Adjusted Infiltration Rate (ac/h)	**0.255**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements ✓

Avg elemental U-Values [W/m²K]	
Pitched roof insulated on slope	0.000 ✓
Pitched roof insulated on ceiling	0.000 ✓
Flat roof	0.000 ✓
Floors with no underfloor heat	0.180 ✓
Floors with underfloor heat	0.000 ✓
Walls	0.160 ✓
Percentage of opening areas [%]	25.331
Average U-value of openings	1.200 ✓

Conformity with max U-value requirements ✓

Max elemental U-Values [W/m²K]	
Roofs	0.000 ✓
Walls	0.160 ✓
Floors	0.180 ✓
External doors windows/rooflights	1.200 ✓

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.101

Performance

BER A3

66.63 kWh/m2/yr

13.10 kgCO2/m2/yr

Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	46.10	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	25.98	
Living Room %	56.35	

Building Elements	Area (m2)
Floors	46.10
Roofs	0.00
Walls	54.73
Doors	0.00
Windows	10.58
Total Element Area	**111.41**

Results	Heat Loss (W/K)
Windows	12.115
Plane Elements	29.169
Fabric	38.082
Total Heat Loss	**81.939**
HLI (W/K/m2)	**1.777**
Adjusted Infiltration Rate (ac/h)	**0.338**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.180
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	22.950
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.000
Walls	0.160
Floors	0.180
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.104

Performance

BER A2

48.21
kWh/m²/yr

9.48
kgCO₂/m²/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	88.56	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	31.89	
Living Room %	36.01	

Building Elements	Area (m²)
Floors	88.56
Roofs	0.00
Walls	79.75
Doors	0.00
Windows	14.47
Total Element Area	**182.78**

Results	Heat Loss (W/K)
Windows	16.569
Plane Elements	45.269
Fabric	59.891
Total Heat Loss	**122.228**
HLI (W/K/m2)	**1.380**
Adjusted Infiltration Rate (ac/h)	**0.275**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m²K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.180
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas (%)	16.339
Average Uvalue of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m²K]	
Roofs	0.000
Walls	0.160
Floors	0.180
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.111

Performance

BER A2

40.18 kWh/m²/yr

7.90 kgCO₂/m²/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	100.04	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	38.38	
Living Room %	38.36	

Building Elements	Area (m²)
Floors	0.00
Roofs	0.00
Walls	86.49
Doors	0.00
Windows	20.16
Total Element Area	**106.65**

Results	Heat Loss (W/K)
Windows	23.084
Plane Elements	36.922
Fabric	45.454
Total Heat Loss	**99.003**
HLI (W/K/m2)	**0.990**
Adjusted Infiltration Rate (ac/h)	**0.263**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

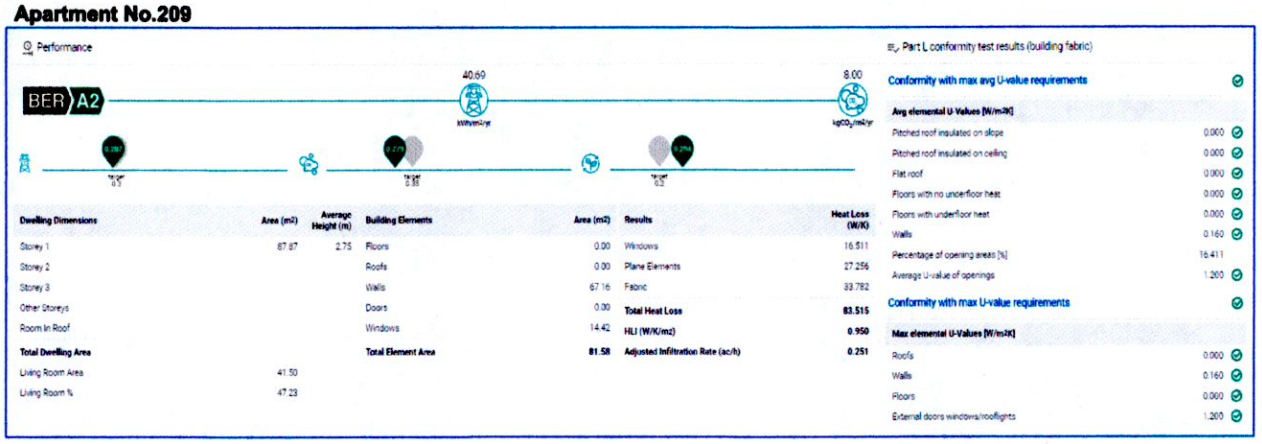
Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.000
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	20.152
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.000
Walls	0.160
Floors	0.000
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.209



Performance

BER A2

40.69 kWh/m²/yr

8.00 kgCO₂/m²/yr

Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	87.87	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	41.50	
Living Room %	47.23	

Building Elements	Area (m2)
Floors	0.00
Roofs	0.00
Walls	67.16
Doors	0.00
Windows	14.42
Total Element Area	**81.58**

Results	Heat Loss (W/K)
Windows	16.511
Plane Elements	27.256
Fabric	33.782
Total Heat Loss	**83.515**
HLI (W/K/m2)	**0.950**
Adjusted Infiltration Rate (ac/h)	**0.251**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

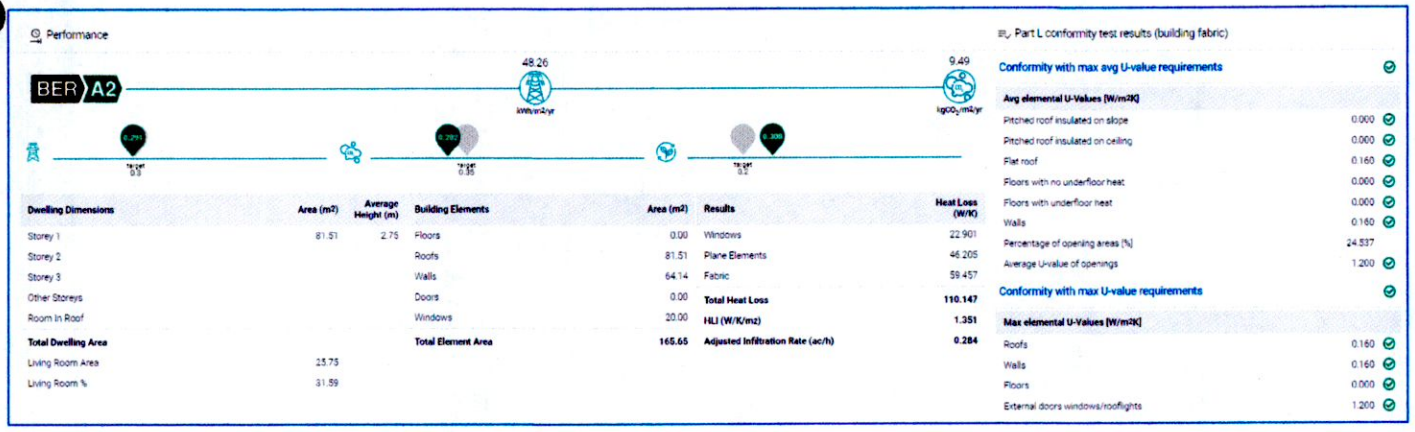
Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.000
Floors with no underfloor heat	0.000
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	16.411
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.000
Walls	0.160
Floors	0.000
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.218



Performance

BER A2

48.26
kWh/m2/yr

9.49
kgCO2/m2/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	81.51	2.75
Storey 2		
Storey 3		
Other Storeys		
Room in Roof		
Total Dwelling Area		
Living Room Area	25.75	
Living Room %	31.59	

Building Elements	Area (m2)
Floors	0.00
Roofs	81.51
Walls	64.14
Doors	0.00
Windows	20.00
Total Element Area	**165.65**

Results	Heat Loss (W/K)
Windows	22.901
Plane Elements	46.205
Fabric	59.457
Total Heat Loss	**110.147**
HLI (W/K/m2)	**1.351**
Adjusted Infiltration Rate (ac/h)	**0.284**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.160
Floors with no underfloor heat	0.000
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas (%)	24.537
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.160
Walls	0.160
Floors	0.000
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.220

Performance

BER A3

62.35 kWh/m2/yr

12.26 kgCO2/m2/yr

Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	50.19	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	30.75	
Living Room %	61.27	

Building Elements	Area (m2)
Floors	0.00
Roofs	50.19
Walls	50.11
Doors	0.00
Windows	13.06
Total Element Area	**113.36**

Results	Heat Loss (W/K)
Windows	14.954
Plane Elements	31.002
Fabric	40.071
Total Heat Loss	**76.194**
HLI (W/K/m2)	**1.518**
Adjusted Infiltration Rate (ac/h)	**0.293**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements ✓

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000 ✓
Pitched roof insulated on ceiling	0.000 ✓
Flat roof	0.160 ✓
Floors with no underfloor heat	0.000 ✓
Floors with underfloor heat	0.000 ✓
Walls	0.160 ✓
Percentage of opening areas [%]	26.021
Average U-value of openings	1.200 ✓

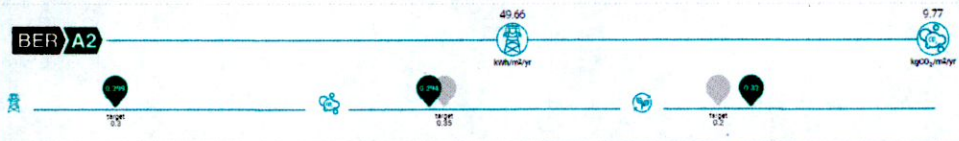
Conformity with max U-value requirements ✓

Max elemental U-Values [W/m2K]	
Roofs	0.160 ✓
Walls	0.160 ✓
Floors	0.000 ✓
External doors windows/rooflights	1.200 ✓

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.305

Performance



Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	55.80	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	24.75	
Living Room %	44.35	

Building Elements	Area (m2)
Floors	0.00
Roofs	0.00
Walls	47.50
Doors	0.00
Windows	6.64
Total Element Area	**54.14**

Results	Heat Loss (W/K)
Windows	7.603
Plane Elements	15.203
Fabric	19.534
Total Heat Loss	**56.846**
HLI (W/K/m2)	**1.019**
Adjusted Infiltration Rate (ac/h)	**0.238**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements ✓

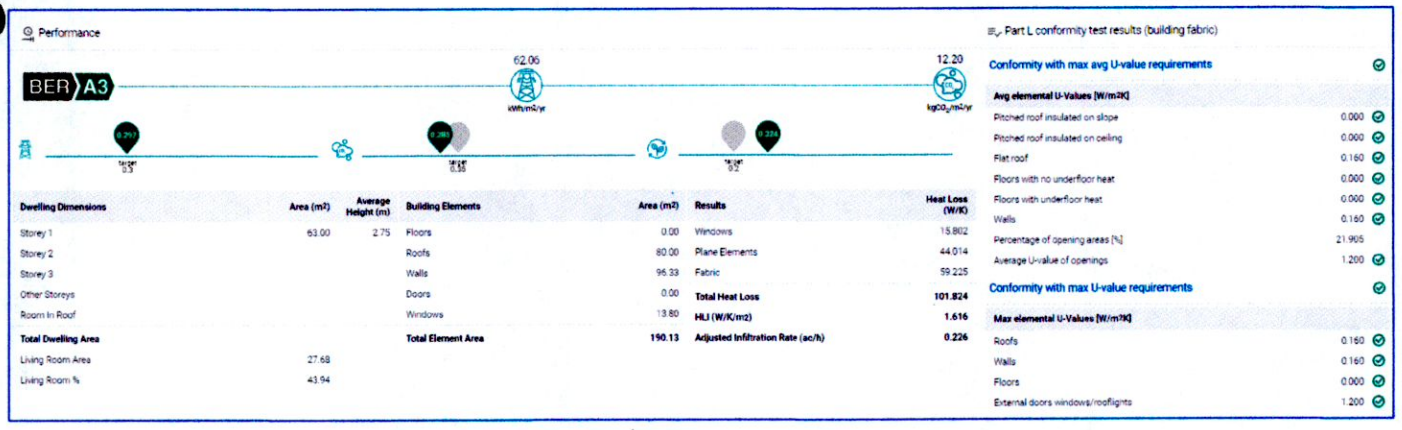
Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000 ✓
Pitched roof insulated on ceiling	0.000 ✓
Flat roof	0.000 ✓
Floors with no underfloor heat	0.000 ✓
Floors with underfloor heat	0.000 ✓
Walls	0.160 ✓
Percentage of opening areas [%]	11.900
Average U-value of openings	1.200 ✓

Conformity with max U-value requirements ✓

Max elemental U-Values [W/m2K]	
Roofs	0.000 ✓
Walls	0.160 ✓
Floors	0.000 ✓
External doors windows/rooflights	1.200 ✓

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.312



Performance

BER A3

62.06 kWh/m2/yr

12.20 kgCO2/m2/yr

Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	63.00	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	27.68	
Living Room %	43.94	

Building Elements	Area (m2)
Floors	0.00
Roofs	80.00
Walls	96.33
Doors	0.00
Windows	13.80
Total Element Area	**190.13**

Results	Heat Loss (W/K)
Windows	15.802
Plane Elements	44.014
Fabric	59.225
Total Heat Loss	**101.824**
HLI (W/K/m2)	**1.616**
Adjusted Infiltration Rate (ac/h)	**0.226**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.160
Floors with no underfloor heat	0.000
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas [%]	21.905
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.160
Walls	0.160
Floors	0.000
External doors windows/rooflights	1.200

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.316

Performance

BER A3

50.24 kWh/m²/yr

9.88 $kgCO_2/m^2/yr$

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	80.00	2.75
Storey 2		
Storey 3		
Other Storeys		
Room In Roof		
Total Dwelling Area		
Living Room Area	30.08	
Living Room %	37.60	

Building Elements	Area (m²)
Floors	0.00
Roofs	80.00
Walls	74.53
Doors	0.00
Windows	13.80
Total Element Area	**168.33**

Results	Heat Loss (W/K)
Windows	13.802
Plane Elements	40.526
Fabric	53.993
Total Heat Loss	**106.281**
HLI (W/K/m2)	**1.329**
Adjusted Infiltration Rate (ac/h)	**0.311**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements ✓

Avg elemental U-Values [W/m²K]	
Pitched roof insulated on slope	0.000 ✓
Pitched roof insulated on ceiling	0.000 ✓
Flat roof	0.160 ✓
Floors with no underfloor heat	0.000 ✓
Floors with underfloor heat	0.000 ✓
Walls	0.160 ✓
Percentage of opening areas [%]	17.250
Average U-value of openings	1.200 ✓

Conformity with max U-value requirements ✓

Max elemental U-Values [W/m²K]	
Roofs	0.160 ✓
Walls	0.160 ✓
Floors	0.000 ✓
External doors windows/rooflights	1.200 ✓

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.402

Performance

BER A2

47.30 kWh/m²/yr

9.30 kgCO₂/m²/yr

Dwelling Dimensions	Area (m²)	Average Height (m)
Storey 1	88.55	2.75
Storey 2		
Storey 3		
Other Storeys		
Room in Roof		
Total Dwelling Area		
Living Room Area	34.10	
Living Room %	38.51	

Building Elements	Area (m²)
Floors	0.00
Roofs	88.55
Walls	103.68
Doors	0.00
Windows	17.10
Total Element Area	**209.33**

Results	Heat Loss (W/K)
Windows	19.580
Plane Elements	50.337
Fabric	67.083
Total Heat Loss	**118.859**
HLI (W/K/m2)	**1.342**
Adjusted Infiltration Rate (ac/h)	**0.275**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements ✓

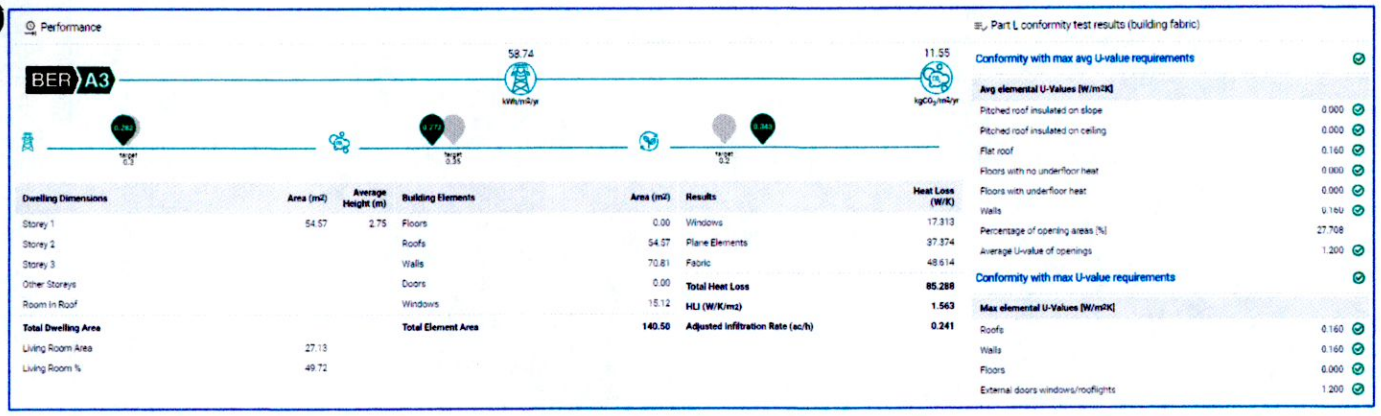
Avg elemental U-Values [W/m²K]	
Pitched roof insulated on slope	0.000 ✓
Pitched roof insulated on ceiling	0.000 ✓
Flat roof	0.160 ✓
Floors with no underfloor heat	0.000 ✓
Floors with underfloor heat	0.000 ✓
Walls	0.160 ✓
Percentage of opening areas [%]	19.311
Average U-value of openings	1.200 ✓

Conformity with max U-value requirements ✓

Max elemental U-Values [W/m²K]	
Roofs	0.160 ✓
Walls	0.160 ✓
Floors	0.000 ✓
External doors windows/rooflights	1.200 ✓

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Apartment No.405



Performance

BER A3

58.74 kWh/m²/yr

11.55 kgCO₂/m²/yr

Dwelling Dimensions	Area (m2)	Average Height (m)
Storey 1	54.57	2.75
Storey 2		
Storey 3		
Other Storeys		
Room in Roof		
Total Dwelling Area		
Living Room Area	27.13	
Living Room %	49.72	

Building Elements	Area (m2)
Floors	0.00
Roofs	54.57
Walls	70.81
Doors	0.00
Windows	15.12
Total Element Area	**140.50**

Results	Heat Loss (W/K)
Windows	17.313
Plane Elements	37.374
Fabric	48.614
Total Heat Loss	**85.288**
HLI (W/K/m2)	**1.563**
Adjusted infiltration Rate (ac/h)	**0.241**

Part L conformity test results (building fabric)

Conformity with max avg U-value requirements

Avg elemental U-Values [W/m2K]	
Pitched roof insulated on slope	0.000
Pitched roof insulated on ceiling	0.000
Flat roof	0.160
Floors with no underfloor heat	0.000
Floors with underfloor heat	0.000
Walls	0.160
Percentage of opening areas (%)	27.708
Average U-value of openings	1.200

Conformity with max U-value requirements

Max elemental U-Values [W/m2K]	
Roofs	0.160
Walls	0.160
Floors	0.000
External doors windows/rooflights	1.200

APPENDIX B NEAP RESULTS – LANDLORD AREAS WITHIN APARTMENT BLOCKS

Electric Radiator & PV Option

For this iteration, electric heating was applied to the landlord areas. To achieve Part L compliance, LED lighting (Luminous Efficacy ≥ 100 Lumens per circuit Watt) with absence/presence detection in common circulation spaces and a 10 kW_p solar PV system would also be required. This would equate to approximately 25 solar panels.

BRIRL Output Document

Compliance Assessment with the Building Regulations (Ireland) TGD-Part L 2017

This report demonstrates compliance with specific aspects of Part L of the Building Regulations. Compliance with all aspects of Part L is a legal requirement. Demonstration of how compliance with every aspect is achieved may be sought from the Building Control Authority.

Scholarstown Residential

Date: Mon Sep 12 10:25:57 2022

Administrative information

Building Details

Address: Scholarstown Residential Development, Co. Dublin, -, -, Co. Dublin, -

NEAP

Calculation engine: SBEMIE

Calculation engine version: v5.5.h.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: 7.0.16

BRIRL compliance check version: v5.5.h.2

Client Details

Name: -

Telephone number: -

Address: -, Co. Dublin, -

Energy Assessor Details

Name: -

Telephone number: -

Email: -

Address: -, Co. Dublin, -

Primary Energy Consumption, CO2 Emissions, and Renewable Energy Ratio

The compliance criteria in the TGD-L have been met.

Calculated CO2 emission rate from Reference building	5.3 kgCO2/m2.annum
Calculated CO2 emission rate from Actual building	5 kgCO2/m2.annum
Carbon Performance Coefficient (CPC)	**0.93**
Maximum Permitted Carbon Performance Coefficient (MPCPC)	**1.15**
Calculated primary energy consumption rate from Reference building	27.6 kWh/m2.annum
Calculated primary energy consumption rate from Actual building	25.3 kWh/m2.annum
Energy Performance Coefficient (EPC)	**0.92**
Maximum Permitted Energy Performance Coefficient (MPEPC)	**1**
Renewable Energy Ratio (RER)	**0.2**
Minimum Renewable Energy Ratio	**0.2**

Heat Transmission through Building Fabric

Element	$U_{A\text{-}Limit}$	$U_{A\text{-}Calc}$	$U_{i\text{-}Limit}$	$U_{i\text{-}Calc}$	Surface with maximum U-value*
Walls**	0.21	0.16	0.6	0.16	GR000002_W1
Floors (ground and exposed)	0.21	0.14	0.6	0.18	SC000003_F_A1
Pitched roofs	0.16	-	0.3	-	"No heat loss pitched roofs"
Flat roofs	0.2	0.16	0.3	0.18	00000003_C_A0
Windows, roof windows, and rooflights	1.6	1.2	3	1.2	GR000002_W1_O0
Personnel doors	1.6	1.2	3	1.2	GR000003_W1_O0
Vehicle access & similar large doors	1.5	-	3	-	"No ext. vehicle access doors"
High usage entrance doors	3	-	3	-	"No ext. high usage entrance doors"

$U_{A\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m2K)]
$U_{A\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m2K)]
$U_{i\text{-}Limit}$ = Limiting individual element U-values [W/(m2K)]
$U_{i\text{-}Calc}$ = Calculated individual element U-values [W/(m2K)]

* There might be more than one surface with the maximum U-value. ** Automatic U-value check by the tool does not apply to curtain walls whose area-weighted average and individual limiting standards are 1.8 and 3 W/m2K, respectively.

Air Permeability	Upper Limit	This Building's Value
m3/(h.m2) at 50 Pa	5	5

Passive Dynamics
SUSTAINABILITY CONSULTANTS

Heat Pump Heating Option – No PV Required

For this iteration, heating to the landlord areas was provided via an air source heat pump. This solution, along with LED lighting (Luminous Efficacy ≥ 100 Lumens per circuit Watt) with absence/presence detection in common circulation spaces, achieves Part L compliance with no requirement for PV panels. The air source heat pump has a COP of 3.6.

BRIRL Output Document

Compliance Assessment with the Building Regulations (Ireland) TGD-Part L 2017

This report demonstrates compliance with specific aspects of Part L of the Building Regulations. Compliance with all aspects of Part L is a legal requirement. Demonstration of how compliance with every aspect is achieved may be sought from the Building Control Authority.

Scholarstown Residential

Date: Mon Sep 12 10:35:54 2022

Administrative information

Building Details

Address: Scholarstown Residential Development, Co. Dublin, -, -, Co. Dublin, -

NEAP

Calculation engine: SBEMIE

Calculation engine version: v5.5.h.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: 7.0.16

BRIRL compliance check version: v5.5.h.2

Client Details

Name: -

Telephone number: -

Address: -, Co. Dublin, -

Energy Assessor Details

Name: -

Telephone number: -

Email: -

Address: -, Co. Dublin, -

Primary Energy Consumption, CO2 Emissions, and Renewable Energy Ratio

The compliance criteria in the TGD-L have been met.

Calculated CO2 emission rate from Reference building	5.7 kgCO2/m2.annum
Calculated CO2 emission rate from Actual building	5 kgCO2/m2.annum
Carbon Performance Coefficient (CPC)	**0.87**
Maximum Permitted Carbon Performance Coefficient (MPCPC)	**1.15**
Calculated primary energy consumption rate from Reference building	29.6 kWh/m2.annum
Calculated primary energy consumption rate from Actual building	25.2 kWh/m2.annum
Energy Performance Coefficient (EPC)	**0.85**
Maximum Permitted Energy Performance Coefficient (MPEPC)	**1**
Renewable Energy Ratio (RER)	**0.15**
Minimum Renewable Energy Ratio	**0.1**

Heat Transmission through Building Fabric

Element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Limit}}$	$U_{i\text{-Calc}}$	Surface with maximum U-value*
Walls**	0.21	0.16	0.6	0.16	GR000002_W1
Floors (ground and exposed)	0.21	0.14	0.6	0.18	SC000003_F_A1
Pitched roofs	0.16	-	0.3	-	"No heat loss pitched roofs"
Flat roofs	0.2	0.16	0.3	0.18	00000003_C_A0
Windows, roof windows, and rooflights	1.6	1.2	3	1.2	GR000002_W1_O0
Personnel doors	1.6	1.2	3	1.2	GR000003_W1_O0
Vehicle access & similar large doors	1.5	-	3	-	"No ext. vehicle access doors"
High usage entrance doors	3	-	3	-	"No ext. high usage entrance doors"

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m2K)]
$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m2K)]
$U_{i\text{-Limit}}$ = Limiting individual element U-values [W/(m2K)]
$U_{i\text{-Calc}}$ = Calculated individual element U-values [W/(m2K)]

* There might be more than one surface with the maximum U-value. ** Automatic U-value check by the tool does not apply to curtain walls whose area-weighted average and individual limiting standards are 1.8 and 3 W/m2K, respectively.

Air Permeability	Upper Limit	This Building's Value
m3/(h.m2) at 50 Pa	5	5