Limerick City & County Council

Mungret Residential Development

Energy Statement Report

MUN-ARUP-ZZ-XX-RP-N-0001

Issue 1 | 20 December 2023

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Executive Summary

This document provides an overview of the energy strategy for the proposed residential development on the grounds of the existing Mungret College, Mungret, Co. Limerick. The main aim is to outperform the sustainability and energy targets set by the Irish Building Regulations, Part L – Conservation of Fuel and Energy Dwellings, with reference to TGD Part L 2022.

To achieve suitable performance in relation to the energy consumption of the development, the energy demand must first be reduced where possible. The proposed glazing shall have a positive effect on solar gain as well as minimising heat loss, thus reducing annual heat energy usage. Suitable performance criteria have been specified for the building fabric elements thus minimising heat loss and reducing annual heat energy usage. All light fittings are specified as being low-energy LED type lights, thus reducing electrical power consumption.

Primary energy sources have been evaluated to identify the most suitable scheme solution for the development, which would also meet Part L requirements. The results of the evaluation were that an air to water heat pump scheme was the most suited with the heat pump providing for both space and water heating. A whole house mechanical heat recovery ventilation installation is also being provided.

A DEAP assessment was carried out for 3 No. typical housing units, which were deemed to appropriately represent all other housing units within the development as well as the Creche building. The results of the assessment showed compliance in each case, where the EPC and CPC of each housing unit was below the limiting value. The average EPC was 0.285, with all individual EPC figures below the limiting MPEPC of 0.300. The average CPC was 0.274, with all individual CPC figures below the limiting MPCPC of 0.350. All housing units are achieving a BER of A2. It is possible for all housing units to achieve a BER of A1 with the addition of between 20m2 and 30m2 of solar PV should this be deemed as a cost effective and appropriate market offering by the developer.

With the national roll-out of smart electricity metering by ESB networks, the proposed development should be enabled to feed excess power from solar PV back to the grid in summer. Likewise, there will be times when the grid experiences excessive renewable energy, leading to cheaper energy which could be used to power electric heat-pump technologies to store heat in underfloor heating or in hot water cylinders. This concept will become more widely accepted as homeowners are transformed into “energy prosumers”, where they produce as well as consume electricity.

1 Abbreviations

Abbreviation/Acronym	Description
AHU	Air Handling Unit
ASHP	Air Source Heat Pump
CHP	Combined Heat and Power
COP	Coefficient of Performance
CPC	Carbon Performance Coefficient
DEAP	Dwelling Energy Assessment Procedure (Ireland)
DHW	Domestic Hot Water
EPC	Energy Performance Coefficient
HVAC	Heating, Ventilation & Air Conditioning
MPCPC	Maximum Permissible Carbon Performance Coefficient
MPEPC	Maximum Permissible Energy Performance Coefficient
NZEB	Nearly Zero Energy Building
PEF	Primary Energy Factor
PV	Photo-Voltaic
SEAI	Sustainable Energy Authority of Ireland
TPER	Total Primary Energy Requirement
WSHP	Water Source Heat Pump

2 Introduction

The aim of this report is to validate the energy efficient and sustainable design of the proposed development. This will be demonstrated by identifying measures taken during the design stage of the development to minimise energy usage and by justifying the renewable energy source technologies proposed for this development.

TGD Part L 2022 of the Irish Building Regulations outlines energy performance criteria which must be achieved, making it a legislative requirement to meet a minimum energy performance level. This report will display compliance to Part L as a base requirement for planning and is to form part of the planning submission to Limerick City & County Council for the proposed development.

The energy performance of the development is also of importance to the landowner / developer due to the economic effect of energy efficient and sustainable design as well as the perceived quality such features have on the development, where customers have greater expectations in terms of environmental impact. It is the aim of the development to outperform legislation where feasible.

The report will be structured regarding the principles underpinning Part L compliance such as energy demand reduction through passive measures and increased supply from renewable and efficient sources. The impact of the energy efficient and sustainable design measures as chosen will be quantified using the SEAI DEAP assessment tool.

All assessments carried out in this report are based on latest Architectural drawings.

3 Proposed Development

The proposed residential development is located on the grounds of the existing Mungret College, Mungret, Co. Limerick as indicated on the overall site plan below. The site is broken down into 2 distinct elements consisting of a standard housing development with 183 No. housing units and an older person's residential apartment building with 55 No. housing units as per the site plans below. A new Creche building, which includes a community facility on the ground floor and 12 No. apartments on the 1st and 2nd floor also forms part of this proposed development. The planning application is therefore seeking permission for a residential development consisting of 250 No. housing units along with a creche and community facility building as follows along with all associated roads, carparking, green spaces, local services, and ancillary utilities infrastructure, etc.

- 38 No. 1 Bed Apartments and 17 No. 2 Bed Apartments within a 3-storey Older Persons Residential Apartment Building complete with associated communal spaces, and local services.
- 12 No. 2 Bed Apartments
- 36 No. 2 Bed Houses
- 108 No. 3 Bed Houses
- 25 No. 4 Bed Houses
- 2 No. 6 Bed Community Houses
- 4 No. 1 Bed Apartments & 8 No. 2 Bed Apartments within a 3-storey Creche Building complete with community facility and coffee shop.

Figure 1: Overall Site Plan

Figure 2: Site Plan of Proposed Housing Development

Figure 3: Site Plan of Older Persons Residential Apartment Building

4 Energy Reduction

Within this section of the report, the development in question is assessed, and compliance is shown, in relation to the energy reduction requirements of Part L. The assessment has been carried out using the Sustainable Energy Authority of Ireland (SEAI) DEAP V4.2.0 software, the results of which are outlined in Section 6.

4.1 Passive Solar

Glazing plays an important role in terms of light and heat energy usage. Generally, an increase in glazing reduces the need for artificial lighting, particularly in dwellings where natural light alone is often enough throughout the day. The amount of glazing used is also a primary factor affecting the amount of solar gain a building experiences. Solar gain can be used to reduce space heating loads, as the heat gain from glazing can contribute significantly towards the space heating requirements of a building.

However, it is also important to consider the role solar gain can play in overheating, as well as the extent of heat loss occurring in areas with a large amount of glazing. It is, therefore, good practice to maximise the use of natural daylight to enhance visual comfort, while also ensuring that thermal performance is not compromised. Therefore, the percentage of opening area within the building envelope of each housing unit has been maintained at circa 20% as a good compromise.

The development has aimed to provide regularly occupied spaces, including bedrooms, living rooms and kitchens with natural daylight to reduce the energy need for artificial light. Natural lighting has less of an impact on occasionally occupied spaces, such as stores, bathrooms and ensuites. These areas have therefore not been targeted for natural lighting.

4.2 Building Fabric

Limitation of heat loss through the fabric of the building is a significant aspect of the Part L regulations. Heat loss through the building fabric is minimised by increasing the thermal insulation to a level which is deemed to be acceptable. U-value is the criteria used to measure such heat loss, where U-value is a measurement of the conductivity of building fabric elements.

The maximum acceptable U-values for the building's fabric elements are outlined below in Table 1. The Proposed values are also given, all of which are lower than the limiting value, demonstrating compliance under this section of Part L.

Table 1: Fabric Element U-values [Adapted from Part L 2019]

Building Fabric Element	Part L 2019 U-Values	Proposed U-Values	Proposed G-Value (Glazing)
Roofs	0.16 W/m^{2}K	0.15 W/m^{2}K	
Walls	0.18 W/m^{2}K	0.15 W/m^{2}K	
Ground / Exposed Floors	0.18 W/m^{2}K	0.15 W/m^{2}K	
External Doors	1.40 W/m^{2}K	1.2 W/m^{2}K	
External Glazing	1.40 W/m^{2}K	1.2 W/m^{2}K	0.65

4.3 Thermal Bridging

A thermal bridge also known as a cold bridge is an area of a building construction which has a significantly higher heat transfer than the surrounding materials. This is typically where there is either a break in the insulation, less insulation or the insulation is penetrated by an element with a higher thermal conductivity, e.g. around windows, doors and other wall openings, at junctions between elements and other locations.

The Acceptable Construction Details as per Part L will be adopted as the minimum proposal for all key junctions where appropriate (i.e. typical/standard junctions). For all bespoke key junctions, details which have been certified by a third-party certification body (such as Agrément or equivalent) will be used or calculated by an NSAI registered thermal modeller.

Heat loss due to thermal bridging is expressed as a multiplier of the total exposed surface area in DEAP calculations. The default value of this multiplier is 0.15 W/m^{2}K in DEAP; and the proposed design target for this is 0.08 W/m^{2}K.

4.4 Building Envelope Air Permeability

Air permeability should be limited in new buildings to reduce uncontrolled ventilation and associated heat losses. This can be facilitated by adopting standard details to form the appropriate air barrier elements (e.g. plaster, vapour control layer, breather membrane) and a regular on-site inspection regime throughout the construction period to ensure that the air barrier is maintained.

TDG Part L - 2022 requires an air permeability level of no greater than 5m^3/m^2/hr @ 50Pa for a new dwelling. The design intent for the proposed dwellings will be to have an air permeability target of 3m^3/m^2/hr @ 50Pa.

A minimum of two tests shall be carried out for all typical housing unit types. Each unique housing unit type shall be tested independently. The air permeability test shall be carried out by an independent third party (National Standards Authority of Ireland or equivalent certification body).

4.5 Light Fittings

It is proposed that all light fittings are to be specified as being low-energy LED type lights, reducing the energy requirement of artificial lighting.

4.6 Insulation of Pipes, Ducts and Vessels

All hot water storage vessels and pipes will be fully insulated. Hot water storage vessels shall have a minimum of 100mm factory installed insulation. All water pipes shall be insulated throughout the building, this will improve energy performance and help protect against legionella and freezing.

4.7 Heating Controls

Heating systems should be effectively controlled to ensure the efficient use of energy. The controls systems for both water and space heating are to be installed to Part L requirements as a minimum standard. It is intended that the system will minimise energy requirements by meeting user requirements closely, and not exceeding them. The ability to monitoring and control heating systems remotely through secure, web-connected, wi-fi services will provide additional flexibility and energy efficiency for residents in these homes.

4.8 Smart Home

With the national roll-out of smart electricity metering by ESB networks, the proposed development will have access to ‘smart technologies’ to take advantage of flexible operating systems. From an energy perspective, future homes should be enabled to feed excess power from solar PV back to the grid (summer, clear-sky days when the home might be vacant). Likewise, there will be times when the grid experiences excessive renewable energy, where wind generation might need to be curtailed (typically in winter). Energy costs would fall at these times and those with electric heat-pump technologies could use this low-cost energy to store heat in underfloor heating or in hot water cylinders. This concept will become more widely accepted as homeowners become “prosumers”, where they are producers and consumers of electricity. ESB Networks will provide assistance in planning and installing an import / export meter to be used with a PV array of capacity up to 6kW for a single-phase supply under their micro-generation support scheme. In this way, excess power generated locally can be fed back into the grid and provide some return to the homeowner.

5 Renewable Energy Sources

Within this section of the report, various energy source technologies are examined. The feasibility and suitability of each option is evaluated, based on the location of the site, the nature of the development, economic criteria, functionality, efficiency and the sustainability of the system in question.

There is a requirement for the development that a proportion of energy sources used are renewable technologies. The minimum requirements, as set out in TGD Part L - 2022 are that 10 kWh/m^2/annum contribute to energy use for domestic hot water heating, space heating or cooling; or that 4 kWh/m^2/annum contribute to the electrical energy used by the dwelling.

To satisfy that a dwelling complies with Part L, it must also be demonstrated that an acceptable carbon performance coefficient (CPC) and an acceptable energy performance coefficient (EPC) have been met. The calculated CPC of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC) of 0.35 and the EPC should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC) of 0.30.

Potential energy sources were reviewed based on the requirements of Part L and their applicability to this development. The systems reviewed included the following:

- Wind Power
- Solar Photovoltaics
- Solar Water Heating
- Air Source Heat Pumps
- Heat Recovery Ventilation
- Exhaust Air Heat Pumps
- Biomass Fuel Heating
- Combined Heat and Power (CHP)

5.1 Wind Power

Electricity could be generated by Wind Power either via standalone micro wind turbines attached to the roof of each house, or via a series of mast-mounted wind turbines installed in a community wind farm type arrangement. The massing of each house has been designed with close consideration given towards both the existing and the new surrounding buildings, all of which would be upset by the inclusion of wind turbines.

Figure 4: Wind Turbine

5.2 Solar Photovoltaic

Solar Photo-Voltaic (PV) panels convert the sun's energy to electricity using semiconductor technology. These could be located at roof level of each house as independent installations or installed as part of a community solar farm type arrangement. The provision of the independent solar panel installations for each house would be feasible but its inclusion will ultimately be determined by its cost and the requirements of the market.

Figure 5: Solar Photovoltaic Panels

It could be utilised as either a feed into the electrical consumer unit for the housing unit or as a direct feed to a specific load such as the heat pump for the housing unit. It can also act as a battery backup for the housing unit.

5.3 Solar Water Heating

Solar panels could be used to provide for the domestic hot water heating requirements of the houses. These could be located at roof level of each house as independent installations or installed as part of a community solar farm type arrangement. However due to the sensitive nature and location of the site, the community solar farm type arrangement would not be feasible. Also, in the context of utilising Heat Pumps for the space heating requirements of the house, solar water heating is counter-productive and not considered a viable technology, as the heat pumps can also be used for the domestic hot water heating requirements of the house.

Figure 6: Solar Water Heating Panels

5.4 Air Source Heat Pumps

It is proposed to install air-source heat pump units to generate warm water to provide for space heating and domestic hot water heating to each housing unit. For the standalone houses there shall be an individual heat pump for each housing unit.

For the apartments a centralised heat pump installation shall be provided. The total heating demand of the apartment building would be met by using a series of interconnected heat pumps installed in a centralised location. A disadvantage of this system is the decentralised nature of the development, and the utilisation of floor space for plant rooms and roof space for the outdoor condenser units. However, for this development it is considered appropriate as there will be a management company in place who will be responsible for operating the apartments facility.

Figure 7: Outdoor Condenser Unit

In each apartment a heat interface unit shall provide its space and water heating requirements and allow for the metering of each individual client's usage.

5.5 Mechanical Whole House Balanced Heat Recovery Ventilation

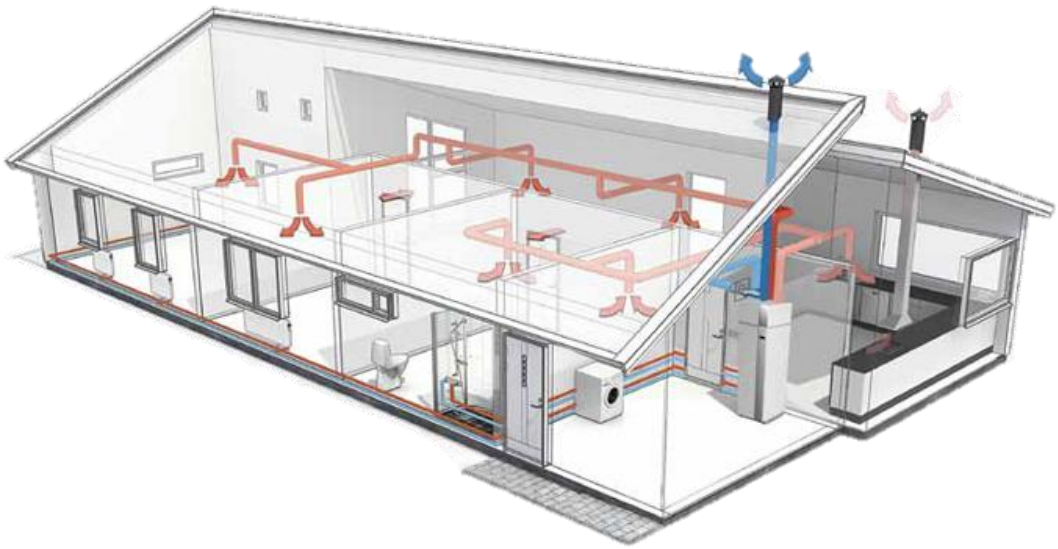
To lower energy usage within buildings they have become increasingly airtight. This increased airtightness while providing lower energy levels can lead to problems because stale air is not exhausted from the dwelling and replaced with outside air. MVHR (Mechanical Ventilation with Heat Recovery) provides outdoor filtered air into a dwelling whilst retaining most of the energy that has already been used in heating the building. It works on the principle of extracting air from the wet rooms (bathrooms, kitchens, etc.) and supplying air into the occupied rooms (living area, bedrooms, etc.). While this works well in terms of minimising heat loss, the housing must still be heated and powered. An air to water heat pump (or gas boiler) may be used for space and water heating.

Figure 8: MVHR Installation

5.6 Exhaust Air Heat Pumps

Exhaust air heat pump technology is based upon recovering heat energy from the wet rooms of the house such as kitchens and bathrooms, then using this energy in a refrigeration cycle to heat water for domestic hot water and space heating requirements.

Figure 9: Exhaust Air Heat Pump System



In this development exhaust air heat pumps could be provided for each housing unit. This option is particularly advantageous for apartments where they are likely to be sold individually in the future. The de-centralisation of plant equipment means that a management company can hand over the maintenance of the equipment if they wish to do so as the equipment is installed within the apartment. Disadvantages of this option include its high capital cost and the requirement for equipment space within the apartment. A 1450 mm x 750 mm room is required with 2400 mm clearance for one heat pump in each apartment.

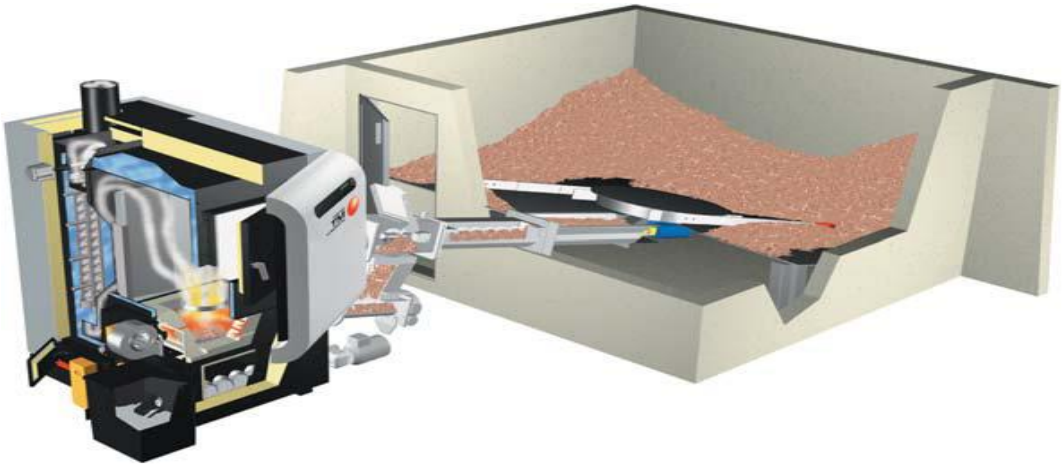
At present it is not proposed to provide these types of heat pumps for any of the housing units in this development as the traditional air source heat pump is preferred.

5.7 Biomass Fuel Heating

A combination of gas-fired and biomass fired boilers is an option for a community-based district heating plant installation for this development. Gas fired plant would be used as a back-up to the wood pellet fired plant.

The following illustration shows a typical biomass fuel heating system, which would be supplemented by a gas boiler.

Figure 10: Biomass Fuel System



Wood pellets or chips would need to be stored next to the boiler room. The location of the boiler room and storage space would need to be carefully considered as this would have a bearing on the method of delivery of the biomass fuel and on the distribution of the heat to the housing units.

Overall however the provision of a biomass fuel heating installation for this residential development is not viable due to the sensitive nature and location of the site, it's scale, it's reliability, and it's ongoing operational and maintenance requirements.

5.8 Combined Heat and Power (CHP)

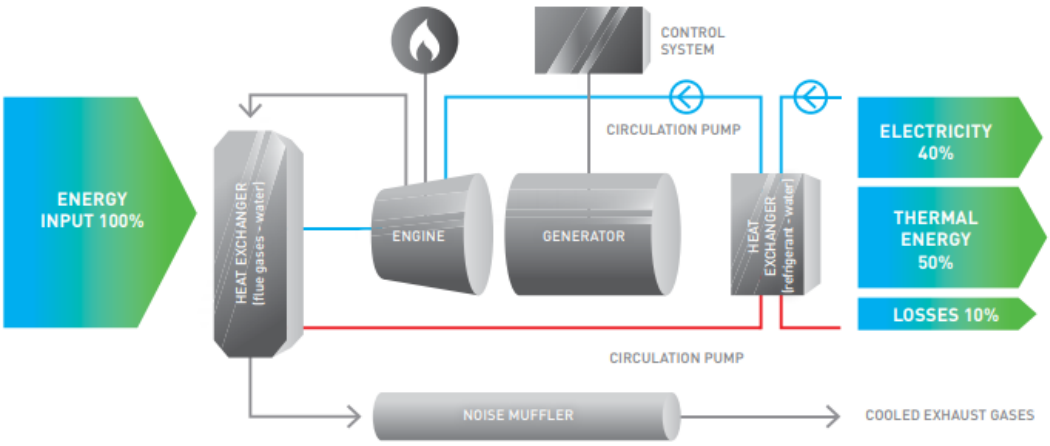
Combined Heat & Power (CHP) is a technology that utilises the heat produced in electricity generation rather than releasing it wastefully into the atmosphere.

For a CHP system to be viable as a community-based district heating plant installation, the year-round base heat load on the plant would need to be roughly 1.6 times that of the electrical load delivered by the CHP plant. In this development, the limiting factor would be to find a use for the heat output, especially in the summer months (this would likely limit the performance of solar domestic water heating systems if installed).

Available plant space for a CHP, accompanying boilers, associated pumps and other ancillary equipment would need to be determined and it would need to be located appropriately (i.e. centrally) to minimise distribution distances and inherent distribution losses in delivering the heat to the housing units.

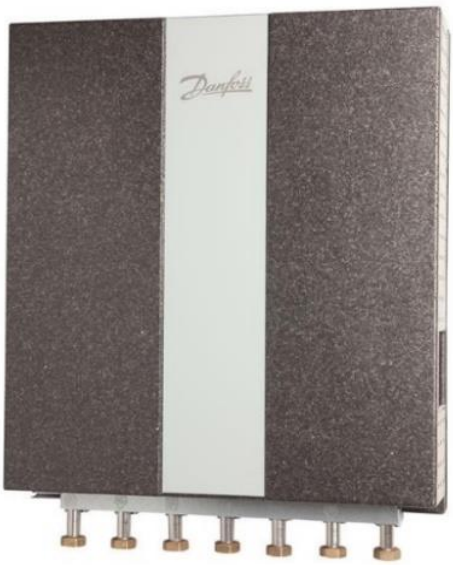
The following illustration shows a typical gas-fired CHP system, which would be supplemented by a gas boiler.

Figure 11: Typical CHP System Diagram



As this is a residential scheme with multiple electrical meters the electrical energy produced by the CHP cannot be sold back to individual tenants. This means that electrical usage would have to be charged to the tenants via a service charge. Each housing unit within the development would have a heat interface unit which would provide both heating and domestic hot water (DHW) to the tenants. The advantage of the heat interface unit is that it allows for metering of heat energy used by the owners/tenants and then they can be billed on this basis. Another advantage is that it allows for the instant production of DHW in the dwelling and negates the need for individual water cylinders.

Figure 12: Heat Interface Unit



Overall however the provision of a CHP installation for this residential development is not viable due to the sensitive nature and location of the site, it's scale, and the availability of matched loads for its output.

6 DEAP Calculation Summary

The conditions as outlined in Sections 3 and 4 have been used to carry out DEAP assessments to ensure that all housing units comply with EPC and CPC limitations and ultimately Part L (2019). The assessment is carried out based on an air to water heat pump installation which will cater for both the space heating and water heating requirements of the housing unit. The DEAP calculations have been carried out for three different typical housing units, which were deemed to be the most appropriate, using SEAI DEAP 4.2.0 software to demonstrate compliance with Part L (2019). The typical housing units selected were as follows and are as shown in Appendix 1.

- Type 1 House – 2 Bed 4 Person
- Type 4 House – 3 Bed 5 Person
- Type 10 House – 4 Bed 7 Person

6.1 DEAP Inputs

The DEAP assessment was carried out based on the proposed input values as listed in Table 2 below, which are applicable to all housing units.

Table 2: DEAP Assessment Input Values

Input Parameter	Input Value
Structural Air Permeability	3m³/m²/hr at 50Pa (or 0.15 ac/h)
Ventilation Method	Whole-House Heat Recovery Ventilation
Specific Fan Power	0.93 W/l/s
External Glazing g-value	0.65
Roof U-Value	0.15 W/m^{2}K
Walls U-Value	0..15 W/m^{2}K
Ground / Exposed Floors U-Value	0..15 W/m^{2}K
External Doors U-Value	1.2 W/m^{2}K
External Glazing U-Value	1.2 W/m^{2}K
Thermal Bridging Factor	0.08 W/m^{2}K
Declared Thermal Loss (Storage & Distribution)	1.2 kWh/day

Lighting	100% Low Energy LED
Thermal Massing Category	Medium - Low

6.2 DEAP Outputs

The results of the DEAP assessment are provided in Table 3 below for each of the typical housing units, where it can be seen to verify compliance to Part L (2019) in all cases.

This verifies that the outlined arrangement for servicing the development is compliant with Part L and is therefore a suitable scheme to use for the development.

Table 3: DEAP Assessment Output Values

Apartment	EPC	CPC	RER	Compliance
Limit	*< 0.300*	*< 0.350*	*> 0.2*	
Type 1	0.281	0.271	0.494	✓
Type 4	0..286	0.276	0.487	✓
Type 10	0..288	0.274	0.517	✓

A more detailed summary of the assessment results can be seen in Appendix B. The summary also includes the results for the inclusion of Solar PV and a cost comparison for the running costs of the housing units both with and without Solar PV. All housing units achieve a BER of A2 without Solar PV and A1 with solar PV.

7 Recommendations and Conclusion

To comply with TGD Part L - 2022 regulations, as part of the Irish Building Regulations, it is recommended that for each housing unit that:

- Passive design is used to minimise energy requirements
- The acceptable construction details for buildings are followed
- The building fabric requirements as outlined in this report are followed
- All lighting used is low-energy LED type lighting
- An air to water heat pump system is used for space and water heating
- A whole house mechanical heat recovery ventilation installation is provided

This report confirms, via the DEAP assessments, that if these recommendations are met, that all the housing units within the proposed residential development will comply with Part L.

Appendix A

DEAP Assessment House Plans

A1 DEAP Assessment House Plans

Figure 13: Type 1 House – 2 Bed 4 Person

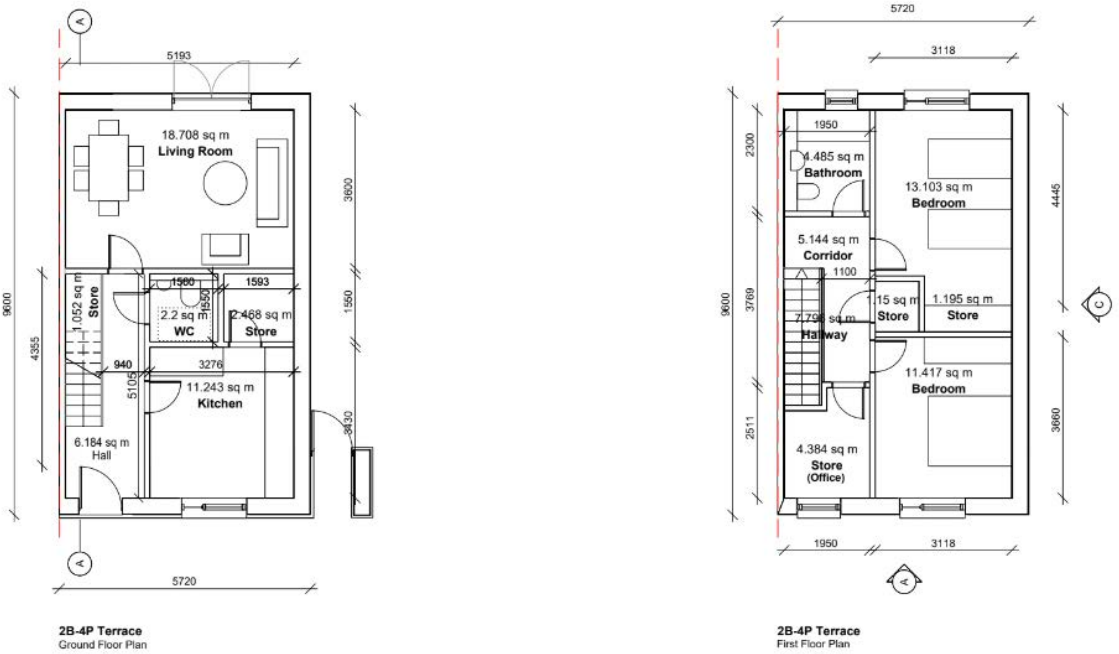


Figure 14: Type 4 House – 3 Bed 5 Person

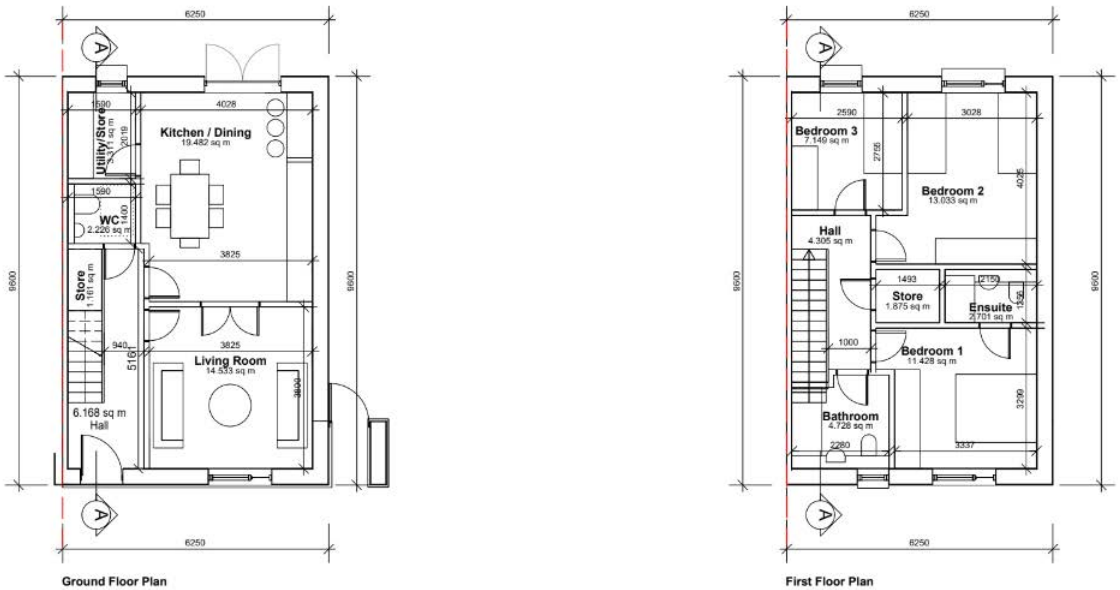
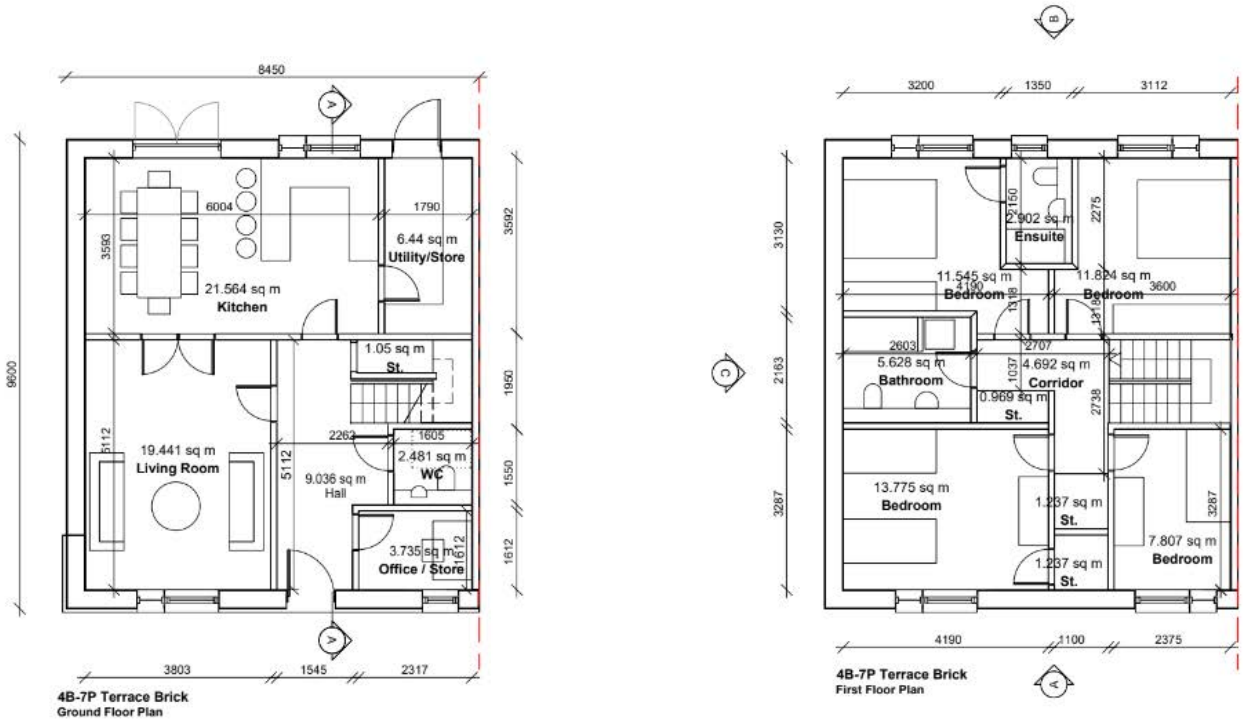


Figure 15: Type 10 House - 4 Bed 7 Person



Appendix B

DEAP Assessment Results Summary

B1 DEAP Assessment Results Summary

Table 4: DEAP Assessment Results Summary Sheet

Assumptions

Electricity Unit Rate	€/kWh	0.17
Standing Charge	€/day	0.41
PSO Levy	€/month	2.84

Type 1 & 4 - PV assumed as a 20m^2 East facing array giving 1,230 kWh/yr; this would increase to approx. 1,500 kWh/yr for a south facing array

Type 10 - PV assumed as a 30m^2 East facing array giving 1,642 kWh/yr; this would increase to approx. 2,016kWh/yr for a south facing array

Inputs

Dwelling Type	Type 1 2 Bed 4 Person	Type 4 3 Bed 5 Person	Type 10 4 Bed 7 Person	Type 1 2 Bed 4 Person	Type 4 3 Bed 5 Person	Type 10 4 Bed 7 Person
Internal Floor Area (m2)	89.16	100.02	136.76	89.16	100.02	136.76
Ventilation	Mechanical Ventilation Heat Recovery	Mechanical Ventilation Heat Recovery	Mechanical Ventilation Heat Recovery	Mechanical Ventilation Heat Recovery	Mechanical Ventilation Heat Recovery	Mechanical Ventilation Heat Recovery
Space heating	Heat Pump	Heat Pump	Heat Pump	Heat Pump	Heat Pump	Heat Pump
Water heating	Heat Pump	Heat Pump	Heat Pump	Heat Pump	Heat Pump	Heat Pump
Solar Photovoltaics	0	0	0	20 m^2	20 m^2	30 m^2

Results

EPC		0.281	0.286	0.288	0.116	0.132	0.122
CPC		0.271	0.276	0.274	0.112	0.127	0.116
RER		0.494	0.487	0.517	0.792	0.763	0.796
BER		A2	A2	A2	A1	A1	A1
BER - Energy	kWh/m2/yr	48.78	47.55	43.25	20.08	21.97	18.27
BER - Carbon	kgCO_2/m2/yr	9.59	9.35	8.50	3.95	4.32	3.59

Energy Consumption & Costs

Space Heating Energy Consumption	kWh/yr	519	639	997	519	639	997
Water Heating Energy Consumption	kWh/yr	1077	1107	1147	1077	1107	1147
Lighting and Auxiliary Energy Consumption	kWh/yr	494	540	699	494	540	699
Solar Photovoltaics Contribution	kWh/yr	0	0	0	1230	1230	1642
Total Energy Consumption	**kWh/yr**	**2090**	**2286**	**2843**	**860**	**1056**	**1201**
Running Costs	**€/year**	**539.03**	**572.35**	**667.04**	**329.93**	**363.25**	**387.9**

Appendix C

DEAP Assessment Results

C1 Type 1 House – Without Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m^2]	Height [m]	Volume [m^3]
Ground Floor	44.58	2.58	115.02
First Floor	44.58	2.40	106.99
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	89.16		222.01

Living Area [m^2]	18.71	**Living area percentage [%]**	20.98
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	44.58
Non-Heat Loss Floor	First Floor	N/A	0	44.58

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	44.58

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	101.48

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	5.920
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	9.370

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	360.1	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	184
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	491.16	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A2	**Energy Value kWh/m²/yr**	**48.78**
CO_2 emissions [kg/m²/yr]	9.59		
EPC	0.281	**EPC Pass/Fail**	**Pass**
CPC	0.271	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	19.84				
Average U value of openings	1.20	Pass			

Permeability test carried out and meets guidelines in TGD L 0.15 | Pass

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	0.00	0.00	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	4240.91	4240.91	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	4348.78	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		4240.91	8589.69	0.49 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		4240.91	8589.69	0.49

C2 Type 1 House – With Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	44.58	2.58	115.02
First Floor	44.58	2.40	106.99
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	89.16		222.01

Living Area [m²]	18.71	**Living area percentage [%]**	20.98
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	44.58
Non-Heat Loss Floor	First Floor	N/A	0	44.58

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	44.58

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	101.48

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	5.920
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	9.370

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	360.1	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	184
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	491.16	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A1	**Energy Value kWh/m²/yr**	**20.08**
CO_2 emissions [kg/m²/yr]	3.95		
EPC	0.116	**EPC Pass/Fail**	**Pass**
CPC	0.112	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	19.84				
Average U value of openings	1.20	Pass			
Permeability test carried out and meets guidelines in TGD L				0.15 | Pass	

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	2558.40	2558.40	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	4240.91	4240.91	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	1790.38	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		6799.31	8589.69	0.79 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		6799.31	8589.69	0.79

C3 Type 4 House – Without Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	49.27	2.58	127.11
First Floor	50.75	2.40	121.80
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	100.02		248.91

Living Area [m²]	14.53	**Living area percentage [%]**	14.53
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	49.269
Non-Heat Loss Floor	First Floor	N/A	0	50.748

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	50.748

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	107.5

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	6.310
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	11.500

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	371.29	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	180
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	491.13	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A2	**Energy Value kWh/m²/yr**	**47.55**
CO_2 emissions [kg/m²/yr]	9.35		
EPC	0.286	**EPC Pass/Fail**	**Pass**
CPC	0.276	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	20.21				
Average U value of openings	1.20	Pass			
Permeability test carried out and meets guidelines in TGD L				0.15 | Pass	

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	0.00	0.00	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	4522.96	4522.96	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	4755.76	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		4522.96	9278.72	0.49 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		4522.96	9278.72	0.49

C4 Type 4 House – With Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	49.27	2.58	127.11
First Floor	50.75	2.40	121.80
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	100.02		248.91

Living Area [m²]	14.53	**Living area percentage [%]**	14.53
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	49.269
Non-Heat Loss Floor	First Floor	N/A	0	50.748

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	50.748

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	107.5

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m²K]	Area [m²]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	6.310
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	11.500

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	371.29	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	180
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	491.13	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A1	**Energy Value kWh/m²/yr**	**21.97**
CO_2 emissions [kg/m²/yr]	4.32		
EPC	0.132	**EPC Pass/Fail**	**Pass**
CPC	0.127	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	20.21				
Average U value of openings	1.20	Pass			
Permeability test carried out and meets guidelines in TGD L				0.15 | Pass	

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	2558.40	2558.40	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	4522.96	4522.96	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	2197.36	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		7081.36	9278.72	0.76 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		7081.36	9278.72	0.76

C5 Type 10 House – Without Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m²]	Height [m]	Volume [m³]
Ground Floor	68.38	2.58	176.42
First Floor	68.38	2.40	164.11
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	136.76		340.53

Living Area [m²]	19.44	**Living area percentage [%]**	14.21
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	68.38
Non-Heat Loss Floor	First Floor	N/A	0	68.38

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	68.38

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	138

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	9.300
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	11.500

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	386.51	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	180
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	471.21	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A2	**Energy Value kWh/m²/yr**	**43.25**
CO_2 emissions [kg/m²/yr]	8.5		
EPC	0.288	**EPC Pass/Fail**	**Pass**
CPC	0.274	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	18.72				
Average U value of openings	1.20	Pass			
Permeability test carried out and meets guidelines in TGD L				0.15 | Pass	

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	0.00	0.00	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	6335.59	6335.59	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	5914.19	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		6335.59	12249.78	0.52 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		6335.59	12249.78	0.52

C6 Type 10 House – With Solar PV

Part L Specification

BER IS NOT PUBLISHED

Property Details

Dwelling Type	Semi-detached house	**Type of BER rating**	New Dwelling - Provisional
Address line 1		**Year of Construction**	2020
Address line 2		**Date of Assessment**	13/08/2020
Address line 3		**Date of Plans**	
County	Co. Limerick	**Planning Reference**	
Eircode	A65F4E2	**Building Regulations**	2019 TGD L
BER Number		**MPRN No.**	
Purpose of Rating	Sale	**Is MPRN shared with another dwelling?**	N/A
Assessor Name			
Comment	MVHR & Heat Pump	**BER number assigned to shared dwelling**	N/A

Dimension Details

	Area [m^2]	Height [m]	Volume [m^3]
Ground Floor	68.38	2.58	176.42
First Floor	68.38	2.40	164.11
Second Floor	0.00	0.00	0.00
Third and other floors	0.00	0.00	0.00
Room in roof	0.00	0.00	0.00
Total Floor Area	136.76		340.53

Living Area [m^2]	19.44	**Living area percentage [%]**	14.21
No of Storeys	2		

Ventilation Details

	Number		
Chimneys	0	**Has permeability test been carried out?**	Yes
Open Flues	0	**Structure type**	N/A
Fans & Vents	1	**Is there a suspended wooden ground floor?**	No
Number of flueless combustion room heaters	0	**Percentage windows/doors draught stripped [%]**	N/A
Is there a draught lobby on main entrance?	No	**Number of sides sheltered**	2
Ventilation method	Balanced whole-house mechanical ventilation with heat recovery	**Mechanical Ventilation Manufacturer**	Mitsubishi
Specific fan power [W/(L/s)]	0.930	**Mechanical Ventilation Model Name**	LGH-50RSDC-E1
Heat exchanger efficiency [%]	0.81	**How many wetrooms (incl. kitchen)?**	4, both

Building Elements - Floor Details

Type	Description	Underfloor heating	U-Value [W/m²K]	Area [m²]
Ground Floor - Solid	Ground Floor	No	0.15	68.38
Non-Heat Loss Floor	First Floor	N/A	0	68.38

Building Elements - Roof Details

Type	Description	U-Value [W/m²K]	Area [m²]
Pitched Roof - Insulated on Ceiling	Pitched Roof	0.15	68.38

Building Elements - Wall Details

Type	Description	U-Value [W/m²K]	Area [m²]
Unknown	Exposed Walls	0.15	138

Building Elements - Door Details

Description	Number of Doors	U-Value [W/m²K]	Area [m²]
Front Door	1	1.2	2.400

Building Elements - Window Details

Glazing type	User defined u-value	U-Value [W/m^{2}K]	Area [m^2]
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	9.300
Triple-glazed, air filled (low-E, en = 0.2, hard coat)	Yes	1.200	11.500

Other Details

Thermal bridging factor [W/m²k]	0.0800	**Thermal mass category of dwelling**	Medium

Heating System - Solar Water Heating

Solar Water Heating Present?	No	**Aperture area of solar collector [m²]**	N/A
Type, manufacturer, model	N/A		
Zero loss collector efficiency, n0	N/A	**Collector heat loss coefficient, a1 [W/m²>K]**	N/A
Annual Solar Radiation [kWh/m²] (Refer to Appendix H in DEAP)	N/A	**Overshading factor**	N/A
Dedicated storage volume [Litres]	N/A	**Combined Cylinder**	N/A
Solar fraction [%]	0.000		

Heating System - Hot Water System

Distribution Losses	386.51	**Combi boiler present?**	No
Supplementary electric water heating	N/A	**Water Storage Volume [L]**	180
Hot water storage manufacturer and model name	Daikin EHVH08S18D6V	**Declared loss factor [kWh/d]**	1.20
Temperature factor unadjusted	0.89	**Temperature Factor Multiplier**	0.81
Primary Circuit loss type	Boiler and thermal store within a single casing (cylinder thermostat present)		
Is hot water storage indoors or in group heating system?	Yes	**Insulation type**	None
Insulation thickness [mm]	0		

Heating System - Dist. system losses and gains

Temperature adjustment [°C]	0	**Control Category**	3	**Responsiveness category**	1
Central heating pumps	1	**Oil Boiler Pump**	0	**Oil boiler pump inside dwelling**	No
Gas boiler flue fan	0	**Warm air heating or fan coil radiators present**	No		

Heating System - Energy Requirements (Individual)

Main space heating system efficiency [%]	471.21	**Space heating efficiency adjustment factor**	1.0000	**Main space heating fuel**	Electricity
Main water heating system efficiency [%]	252.14	**Water heating efficiency adjustment factor**	1.0000	**Main water heating fuel**	Electricity
Secondary heating system efficiency [%]	N/A	**Fraction of heating from secondary heating system**	N/A	**Secondary space heating system fuel**	None
Fraction of main space and water heat from CHP	N/A	**Electrical efficiency of CHP**	N/A	**Heat efficiency of CHP**	N/A
CHP Fuel type	N/A				

Summary for Part L Conformance (Applies to TGD L 2008/2011/2019 for new dwellings only)

BER Number		**Building Regulations**	**2019 TGD L**
BER Result	A1	**Energy Value kWh/m²/yr**	**18.27**
CO_2 emissions [kg/m²/yr]	3.59		
EPC	0.122	**EPC Pass/Fail**	**Pass**
CPC	0.116	**CPC Pass/Fail**	**Pass**

Part L Conformance - Fabric

Conformity with Maximum avg U-value requirements	**U-value [W/m²K]**	**Pass/Fail**	**Conformity with Maximum U-value requirements**	**U-Value [W/m²K]**	**Pass/Fail**
Pitched roof insulated on ceiling	0.15	Pass	**Roofs**	0.15	Pass
Pitched roof insulated on slope	0	Pass	**Walls**	0.15	Pass
Flat Roof	0	Pass	**Floors**	0.15	Pass
Floors with no underfloor heat	0.15	Pass	**External doors / windows / rooflights**	1.20	Pass
Floors with underfloor heat	0.00	Pass			
Walls	0.15	Pass			
Percentage of opening areas [%]	18.72				
Average U value of openings	1.20	Pass			

Permeability test carried out and meets guidelines in TGD L 0.15 | Pass

Part L Conformance - Renewables (applies to TGD L 2019)

	Source	Renewables Primary Energy	Total Primary Energy	RER
+ Delivered energy	PV/Wind	3415.36	3415.36	
+ Delivered energy	Other	0.00	0.00	
+ Delivered energy	Solar	0.00	0.00	
+ Delivered energy	Biomass	0.00	0.00	
+ Delivered energy	Biodiesel	0.00	0.00	
+ Delivered energy	Bioethanol	0.00	0.00	
+ Environmental energy	HP	6335.59	6335.59	
+ Saved energy	CHP	0.00	0.00	
+ District heating	District Heating	0.00	0.00	
+ Delivered energy	Grid	0.00	2498.83	
+ Delivered energy	Thermal	0.00	0.00	
SUBTOTAL		9750.95	12249.78	0.80 - Pass
Energy not used in Regulated Loads	PV/Wind/CHP	0.00	0.00	
TOTAL		9750.95	12249.78	0.80