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Purpose Planning

Version P.00.02

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ENERGY STATEMENT

RESIDENTIAL DEVELOPMENT
CLONBURRIS K1
CLONDALKIN
CO. DUBLIN

Architect Davey Smith Architects

Services Engineers BBSC Consulting Engineers

Planning Consultant **Armstrong Fenton Associates**

On Behalf of Kelland Homes Ltd.

Revision	Date of Issue	Reason For Issue	By	Chk'd
P.00.02	01 Jun 2022	ISSUED FOR PLANNING	BON	BON

CLONBURRIS PLANNING APPLICATION DEVELOPMENT DESCRIPTION MAY 2022

Kelland Homes Ltd seeks permission for development on a site area of 6.3Ha, on lands within the townland of Cappagh, Dublin 22. The proposed development is located west of the Ninth Lock Road, south of the Dublin-Cork railway line, north of Cappaghmore housing estate and Whitton Avenue, and east of an existing carpark / park & ride facility at the Clondalkin Fonthill train station and the R113 (Fonthill Road). The proposed development is located within the Clonburris Strategic Development Zone (SDZ), within part of the development areas of Clonburris Urban Centre (i.e. CUC-S4) and Clonburris South East (i.e. CSE-S1 & CSE-S2), as identified in the Clonburris SDZ Planning Scheme 2019.

The proposed development consists of the construction of 294 no. dwellings, crèche and retail / commercial unit, comprised of:

- 118 no. 2, 3 & 4 bed, 2 storey semi-detached and terraced houses;
- 104 no. 2 & 3 bed duplex units accommodated in 10 no. 3 storey buildings;
- 72 no. 1 & 2 bedroom apartments in 2 no. 4 & 6 storey buildings;
- 2 storey creche (c.500m²);
- 1 no. retail /commercial unit (c.150m²).

Access to the development will by via the permitted road network (under Ref. SDZ20A/0021) which provides access from the Ninth Lock Road to the east and the R113 (Fonthill Road) to the west. The proposed development will connect into the permitted infrastructural works as approved under the Clonburris Strategic Development Zone Planning Scheme (2019) and permitted under Ref. SDZ20A/0021, with the proposed development connecting into the permitted surface water drainage attenuation systems i.e. 1 no. pond, 3 no. modular underground storage systems and 1 no. detention basin combined with modular underground storage systems. The proposed wastewater infrastructure will connect into a permitted foul pumping station and pipe network within proposed road corridors to facilitate drainage connections to future wastewater drainage infrastructure within the adjoining SDZ lands (including future Irish Water pumping station granted under SDZ21A/0006).

The proposed development also provides for all associated site development works above and below ground, public & communal open spaces, hard & soft landscaping and boundary treatments, surface car parking, bicycle parking, bin & bicycle storage, public lighting, plant (M&E), utility services & 4 no. ESB sub-stations.

This application is being made in accordance with the Clonburris Strategic Development Zone Planning Scheme 2019 and relates to a proposed development within the Clonburris Strategic Development Planning Scheme Area, as defined by Statutory Instrument No. 604 of 2015.2

EXECUTIVE SUMMARY

Kelland Homes appointed BBSC, March 2022, to study the impact on energy to the development as set out under SI 600/2001.

This report sets out the engineering pathways to demonstrate the engineering solutions employed in the Houses, Maisonettes to achieve a A2 BER level using DEAP and SEAI SR50-5 worksheet tools in accordance with Part L, Domestic of the Technical Guidance Document.

The Creche, Office and other commercial development shall a A2 BER level using NEAP achieve Part L, Building other than Dwellings of the Technical Guidance Document.

Domestic Element of Development	
BER:	A2 NZEB
Heat Pumps:	to provide both Domestic Hot Water and Space Heating Hot Water via Radiators to each dwelling. • Maisonettes Waste Air Heat Pumps • Houses shall employ outdoor condensers running to internal heat exchangers and vessels
Part F Ventilation :	• Maisonettes Waste Air Heat Pumps pulling air via fans, ducts and grilles from wet areas to heat pump and recovery energy from same, air enters via engineered wall vents to suit space requirements • Houses, whole house demand control extract ventilation, using central fan and engineered wall vents to suit space requirements • All fans to be A rated
Pumps:	All space and water pumps to be A rated with low energy consumption
Lighting:	All LED
Public Street Lighting:	All LED
Electrical Energy Generation:	Solar Photovoltaics to be provided to each roof to suit SEAI BER requirements in accordance with Part L in force at the time of sale.
Fabric U-Values:	Walls – 0.18, Roofs – 0.16, Doors & Windows – 1.4, Floors – 0.18 W/m²/K
Thermal Bridging:	Limited to 0.05 of losses.
Air Tightness:	Target 2.5 m³/hr/m² or (0.13 Air Changes Per Hour of infiltration)
Part B:	All services openings to be fire sealed to suit each building construction detail and build up.

Commercial Elements of Development	
BER:	A2 NZEB
Heat Pumps:	Heat Pumps outdoor condensers running to internal heat exchangers and vessels running to internal AC units for Cafe, Gym, Retail, Office, Healthcare units. Underfloor heating for Creche
Water Heating	Undersink Electrically Power Water heaters
Part F Ventilation :	Energy recovery ventilation units for Fresh air and foul air requirements with ductwork running to wall mounted louvres using local system to minimise energy losses.
Pumps:	All space and water pumps to be A rated with low energy consumption
Lighting:	All LED
Public Street Lighting:	All LED
Electrical Energy Generation:	Solar Photovoltaics to be provided to each roof to suit SEAI BER requirements in accordance with Part L in force at the time of sale or lease.
Fabric U-Values:	Walls – 0.21, Roofs – 0.16, Doors & Windows – 1.6, Floors – 0.21 $W/m^2/K$
Thermal Bridging:	Limited to 0.05 of losses.
Air Tightness:	Target 2.5 $m^3/hr/m^2$ or (0.13 Air Changes Per Hour of infiltration)
Part B:	All services openings to be fire sealed to suit each building construction detail and build up.

Contents

1 PURPOSE OF REPORT

Kelland Homes Ltd. appointed BBSC, March 2022 to study and advise on the impact on energy to the development as set out under SI 600/2001.

The development will be over a number of phases.

It shall comprise Apartments, landlord areas, civic amenity as per current planning requirements.

2 PRINCIPLE STANDARDS

2.1 BUILDING REGULATIONS

- Technical Guidance Documents as A through M as published and set out in Law, Department of the Environment, relevant edition relates to date of publication and date of building.
- S.I. No. 600/2001 - Planning and Development Regulations, 2001
- Domestic Energy Auditing Procedure, Version 4.2 Published by SEAI

2.2 GENERAL

The purpose of this Sustainability Report is to define the requirements for achieving Part F & L of the Building Regulations with respect to the Energy usage of the development.

Planning requirements applicable shall be to the South Dublin County Council Development Plan 2016-2022, Section 10 E2 Objective 2, E2 Objective 3, E2 Objective 7.

This report aims to satisfy the legislative planning requirements by addressing how the overall energy strategy of the proposed development has been approached in a holistic manner, striving to meet the highest standards of sustainable building design such as passive solar design, high efficiency systems and use of renewable energy technologies.

Principle energy targets and objectives shall be nZEB (Near Zero Energy Building As defined by Part L of the building regulations, current edition at time of publication). This report sets out how the building will achieve these objectives, the underpinning Part L compliance are energy demand reduction through passive measures and increased supply from renewable and efficient sources.

The proposed design will employ the necessary engineering solutions to follow this principle.

The proposed site development will meet or exceed where feasible the requirements of the Part L 2021 building regulations, which stipulates requirements on minimum renewable contribution, minimum fabric and air permeability requirements, maximum energy use and carbon dioxide emissions as calculated using the SEAI published DEAP (Dwellings Energy Assessment Procedure) methodology excel workbook.

2.3 SITE LOCATION

The Site is a Green field site, off Ninth Lock Road and adjacent to Cappaghmore, Irish Rail Station: Fonthill

Grid ref:	O 06351 32471
X (ITM)	706292
Y(ITM)	732495
Latitude :	53.332021
Longitude :	-6.4041688

(https://irish.gridreferencefinder.com/)

2.4 SCHEDULE OF UNITS

The following tables details the units. Refer to the Schedule of space and accommodations for full details

Unit Description	Quantity
House A	
Variant A1	42
Variant A2	37
Variant A3	5
House B	19
House C	12
Duplex Block A	16
Duplex Block B	16
Duplex Block C	12
Duplex Block D	12
Duplex Block E	8
Duplex Block F	8
Duplex Block G	8
Duplex Block H	8
Duplex Block I	8
Duplex Block J	8
Apartments Block A	44
Apartments Block B	20
Retail Unit (150sqm)	1
Creche (500sqm)	1
Totals	
Dwellings	283
Commercial	2
Total	285

3 LEGISLATIVE/PLANNING REQUIREMENTS

3.1 SOUTH DUBLIN DEVELOPMENT PLAN 2019-2022

The following policies of Local County Council shall be applied

Section / Policy	Commentary pertaining to proposed development
ENERGY (E) Policy 4 Energy Performance in New Buildings	
E4 Objective 1: To ensure that medium to large scale residential and commercial developments are designed to take account of the impacts of climate change, including the installation of rainwater harvesting systems, and that energy efficiency and renewable energy measures are incorporated in accordance with national building regulations, policy and guidelines.	All dwellings shall be nZEB, A2 or better as per Part L as published after the development plan
E4 Objective 2: To support the passive house standard or equivalent for all new build in the County.	All dwellings shall be nZEB, A2 or better as per Part L as published after the development plan
E7 Objective 1: To encourage and support the development of solar energy infrastructure for on-site energy use, including solar PV, solar thermal and seasonal storage technologies.	Solar PV panels are to be incorporated in the scheme.
E7 Objective 2: To encourage and support the development of solar energy infrastructure for local distribution, including solar PV, solar thermal and seasonal storage technologies	Using DEAP the apartments and houses are required to use PV panels to generate electrical energy and the sample energy savings per year is addressed herein per sampled units.
ENERGY (E) Policy 11 Service Providers and Energy Facilities	This is addressed in the Utility Report forming part of this submission. All existing overhead cables are to be rerouted underground, working with EirGrid the design shall be developed to address this objective.
CAR PARKING FOR ELECTRIC VEHICLES	
TM7 Objective 4: To make provisions for the use of electric vehicles through a significant increase in the provision of clearly and exclusively designated electric car charging points on public and private land in partnership with ESB and other relevant stakeholders and land owners	1 in 10 of car parking spaces shall be provided with car chargers, 2.4 to 3.7kw in size 1 in 30 spaces, subject to analysis by ESB Networks, Tesla will be provided with or provision for future fast charging. These chargers are commercial in nature and exceed ESB guidelines for domestic levels of connection Ducting will be provided for all site car parking in accordance with Part L 2021 section 1.4.6.
11.4.3 CAR PARKING FOR ELECTRIC VEHICLES	

Section / Policy	Commentary pertaining to proposed development
The Electric Transport Programme (2008) contains a target for 10% of the national road transport fleet to be electrically powered by 2020. To facilitate the use of electrically operated cars and bicycles in line with National Policy, all developments shall provide facilities for the charging of battery operated cars at a rate of up to 10% of the total car parking spaces. The remainder of the parking spaces should be constructed to be capable of accommodating future charging points, as required. The Planning Authority will also consult with ESB Networks to continue the roll-out of Rapid Charge points throughout the County. Particular emphasis will be placed on the provision of such spaces within centres of commercial activity, as outlined by Movement Framework Plans, Area Access Plans and other strategic planning documents.	
11.7.2 ENERGY PERFORMANCE IN NEW BUILDINGS	
The construction of new residential and non-residential buildings should comply with the requirements of the current Building Regulations Part L – Conservation of Fuel and Energy (2008 and 2011), and any other supplementary or superseding guidance documents	Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021) to be applied SEAI DEAP current edition to be applied for BER
Development proposals for new residential and non-residential buildings should have regard to the DECLG 'Towards nearly Zero Energy Buildings in Ireland - Planning for 2020 and Beyond', which promotes the increase of near Zero Energy Buildings (nZEB).	Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021) to be applied which requires nZEB
Residential developments should also have regard to Criteria 5 and 9 of the DEHLG Urban Design – A Best Practice Guide (2009) which relate to efficiency and adaptability.	These standards have been addressed in the Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021)
The use of green building methods such as BREEAM (Building Research Establishment Environmental Assessment Methodology) and LEED (Leadership in Energy Efficiency and Design) ensure a whole-life cycle approach to building design including operational carbon and embodied carbon. This holistic approach results in low energy demand buildings with a significantly reduced carbon footprint and a higher commercial value	These standards have been addressed in the Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021)
E7 Objective 1: To encourage and support the development of solar energy infrastructure for on-site energy use, including solar PV, solar thermal and seasonal storage technologies.	
11.7.5 SOLAR ENERGY	
Development proposals for solar energy development must: Prioritise south facing aspects and have an inclination of between approximately 35 and 50 degrees, depending on the use of solar PV or solar thermal technologies,	Using DEAP the apartments and houses are required to use PV panels to generate electrical energy and the sample energy savings per year is addressed herein per sampled units.

Section / Policy	Commentary pertaining to proposed development
Be designed to take account of over-shadowing from other solar installations on site and from existing elements of the built environment such as chimneys, parapet, roof plant equipment, taller buildings and structures in the immediate vicinity,	

4 PART F

4.1 PRINCIPLE STANDARD

- Technical Guidance Document F - Ventilation (2009)
- Leakage classification of Class 2 or better as defined in IS EN 13141-7

4.2 COMMENT

Each Dwelling is to be sealed against un-wanted external air, infiltration.

This is to be achieved using certified building products CE and Irish Agrément certification.

As a result of sealing of the building it is intended to meet the requirements of Part F, section 1.2.3 by means of Mechanical Ventilation with Heat Recovery (MVHR). This unit shall fully comply with the requirements of Section 1.2.3., with 80% or better energy recovery.

Air shall be supplied to all habitable rooms and removed from ancillary rooms i.e. bathrooms etc.

All air shall be ducted in Class E fire rated Ductwork, with fire dampers at all fire compartment zones.

Air shall be feed from the external walls on the same level as the apartment, no ducting shall rise vertical or cross structural floors.

All ducting shall be contained in the apartment it services.

4.3 AIR PERMEABILITY OF THE DWELLING.

Air Tightness shall not exceed the limits as laid down in Part L, Section 1.5.4.2, 7 $m^3/hr/m^2$. The apartments shall be tested as per the requirements of section 1.5.4, Air permeability pressure tests.

4.4 VENTILATION CHARACTERISTICS OF THE DWELLING AND VENTILATION EQUIPMENT;

The building regulations permit a number of solutions to achieve compliance with Part F.

Currently Part F allows the following or similar systems employing these principles and Irish Agrément certificated systems.

DEAP allows for additional systems and is detailed in the SEAI DEAP manual

- Centralized Continuous Mechanical Extract Ventilation (CMEV)
- Centralized Mechanical Ventilation with Heat Recovery (MVHR)
- Natural Ventilation

DEAP

- Intermittent Fans and passive vents (Extract fans, Passive stack ventilators, Trickle vents or air bricks)
- Positive input ventilation
- Mechanical extract ventilation
- Exhaust Air Heat Pumps

Apartments will generally be heated and ventilated by means of waste air heat recovery system providing heat from the waste hot air in the apartment, this solution is recognised in the Part F

Houses will be ventilated by means of an Irish Agrément certificated Demand Controlled Mechanical Extract Systems. A demand-driven ventilation system will ventilate each dwelling comprising Humidity controlled ventilators to continuously transport the exhaust air from the bathrooms, kitchen, utility room and WC to external, creating a slightly reduced, or negative air pressure in the living spaces. Due to this low-pressure fresh air is made up to the living and sleeping areas through humidity controlled fresh air inlets. Air inlets will be acoustic and wind pressure protected and ensure draught free fresh air.

System Components:

- Air inlets to bring fresh air to habitable rooms
- Extract units to transfer moisture or odour intensive air to external via ducting and a central extract fan(s).
- Central electric constant pressure fan to extract moisture and odour intensive air from each dwelling to external.

Humidity sensors in the fresh air inlets and extract units automatically adjust air flow volume to ensure a comfortable room climate. The system automatically adjusts ventilation volume according to the humidity.

All ducts running to the unit from or too external shall be insulated to reduce cold bridging effects.

This distance between intake and discharge shall not be less than 3m in so far as is practicable.

5 COMPLIANCE (PART L AND PART F)

The principal standard to be employed, and reference model.

- Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2021)
- Table E1.6 Example F Mid Floor Apartment Dwelling space heating-heat pump and continuous mechanical extract ventilation
- nZEB or Part L

These stipulates the requirements for

- the minimum fabric and air permeability requirements,
- maximum primary energy use and carbon dioxide (CO2) emissions
- to be calculated using the DEAP (Domestic Energy Assessment Procedure) methodology.

This is a national standard and compliance is compulsory for all new dwellings.

Three design aspects demonstrate compliance:

- The limitation of primary energy use and CO2 emissions
- Building fabric (namely thermal performance)
- The use of renewable energy sources

5.1 LIMITATION OF PRIMARY ENERGY USE AND CO2 EMISSIONS

To demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated Energy Performance Coefficient (EPC) shall be no greater than the Maximum Energy Performance Coefficient (MEPC).

- As per section 0.7.1, Part L, MPEPC is 0.30.

To demonstrate that an acceptable CO2 emission rate has been achieved, the calculated Carbon Performance Coefficient (CPC) of the dwellings being assessed will be no greater than the Maximum Carbon Performance Coefficient (MPCPC).

- As per Section 0.7.2, Part L, MPCPC is 0.35.

5.2 SIZE, GEOMETRY AND EXPOSURE OF THE DWELLING

Refer to the Architects general arrangements, site plan for details of the Buildings size, geometry and exposure.

5.3 MATERIALS USED FOR CONSTRUCTION OF THE DWELLING

The building shall be built of walls, floors and roofs as detailed on the Architects drawings the proposed U-Values shall meet or exceed the requirements as set out in Part L.

Table 1	**Maximum elemental U-value (W/m^2K)[1, 2]**	
Column 1 Fabric Elements	**Column 2 Area-weighted Average Elemental U-value (Um)**	**Column 3 Average Elemental U-value – individual element or section of element**
Roofs		
Pitched roof - Insulation at ceiling - Insulation on slope	0.16 0.16	0.3
Flat roof	0.20	
Walls	0.18	0.6
Ground floors[3]	0.18	0.6
Other exposed floors	0.18	0.6
External doors, windows and rooflights	1.4[4,5]	3.0

Notes:

1. *The U-value includes the effect of unheated voids or other spaces.*
2. *For alternative method of showing compliance see paragraph 1.3.2.3.*
3. *For insulation of ground floors and exposed floors incorporating underfloor heating, see paragraph 1.3.2.2.*
4. *Windows, doors and rooflights should have a maximum U-value of 1.4 W/m^2K.*
5. *The NSAI Window Energy Performance Scheme (WEPS) provides a rating for windows combining heat loss and solar transmittance. The solar transmittance value g_{perp} measures the solar energy through the window.*

5.4 THERMAL INSULATION OF THE DIFFERENT ELEMENTS OF THE BUILDING FABRIC

The Building fabric shall be constructed form various differing materials with different thermal properties. For full data on elements used in construction shall be listed as part of the BCAR process with the total U-Values as per above table, when calculated as per Part L Appendix A and B.

5.5 EFFICIENCY, RESPONSIVENESS AND CONTROL CHARACTERISTICS OF THE HEATING SYSTEM(S)

The heating system control characteristics is defined as per the requirements of DEAP and Part L for the use of Heat Pumps.

5.6 SOLAR GAINS THROUGH GLAZED OPENINGS OF THE DWELLING

Solar gains are based on aspect to the sun. The results will calculated by means of the DEAP spreadsheet and or the SEAI berportal.seai.ie for online calculation of BERs.

5.7 THERMAL STORAGE (MASS) CAPACITY OF THE DWELLING

The buildings are being constructed of Concrete Materials with storage capacities as indicated in the databases used for the SEAI published in the National Calculation Methodology.

That stated the buildings insulation envelope will be on the inner side of the occupied wall thus ensuring that the buildings thermal response is lightweight in nature.

5.8 THERMAL BRIDGING

The impact of Thermal Bridging can result in a heat loss of 15%, as a result the development shall conform to the meet or exceed the Approved Construction Details and the proposed details shall be finalised during the BCAR process.

5.9 RENEWABLE AND ALTERNATIVE ENERGY GENERATION TECHNOLOGIES INCORPORATED IN THE DWELLING

Each Dwelling shall be provided with Photovoltaic panels to produce electrical energy to meet or exceed the 4 kw/hr/annum/ m^2 requirement.

Part L, section 1.2.1, allows for Heat pumps to be define the Renewable Energy requirement and the effect of heat pumps is included in the calculation procedure.

The apartments shall be heated or cooled by Heat Pumps.

These shall be verified using BER software as published by SEAI and operated by a licensed BER consultant as part of the design and during the BCAR process.

Photovoltaic cells shall be applied, however the requirement to provide green roofs will limit this or Thermal Solar Cells for water heating.

5.10 PRIMARY ENERGY USAGE.

It is envisaged to provide on a dwelling-by-dwelling basis a Electrically operated Heat Pump, Waste Air heat recovery type, it shall feed heat via radiators with pipes to the space and shall provide heat via coils to the hot water storage vessel.

Storage vessel shall be selected to be A rated or better.

Controls shall be by means of valves linked to temperature and 2 zone control valves, these shall be supplemented with each radiator being thermostatically controlled.

Radiators to be selected in accordance with SR50 calculation methodology

5.11 THE FUEL USED TO PROVIDE SPACE AND WATER HEATING, VENTILATION AND LIGHTING.

The following systems shall be provided and operated

- Space Heating
- Air to Water Heat Pump.
- Water Heating
- Air to Water heat pump with summer immersion to a calorifier
- Lighting

Shall be by means of LED Fittings, electrically operated.

5.12 WATER FIXTURES & SANITARY FITTING

The calculation methodology requires the use of water consumption figures provided from manufacturers' product details.

Before the assessment can be carried out, figures will need to be collected from manufacturers product information to determine the consumption of each terminal fitting DEAP-Water-Efficiency-Calculator_v.0 Calculation Tool (SEAI) Typical 3-bedroom calculation indicated the maximum flowrates etc to be employed.

Using the tool, the values are determined as, 184.19 litres per unit time per person as per the calculation for the above example.

6 BUILDING SERVICES

The following details the proposed building services solutions to be applied

<table>
<tr><th>Method of Heating :</th><th>To be a HARP registered Heat Pump</th></tr>
<tr><td>Heating appliance efficiency:</td><td>Greater than 600 % subject to BER Calculations etc. based on the final selection of products to be used</td></tr>
<tr><td>Space heating and hot water supply system controls</td><td>Controls shall meet the requirements as per 'Heating and Domestic Hot Water Systems for Dwellings- Achieving Compliance with TGD Part L 2008' Section 8 Heat pump systems. In summary
<table>
<tr><th>Type</th><th>Heat Pump</th></tr>
<tr><td>Medium</td><td>Refrigerant Gas/ Water</td></tr>
<tr><td>Efficiency</td><td>600 % (Calculations indicate 720 %)</td></tr>
<tr><td>Radiators</td><td>High-efficiency radiators with high water volume to be utilized
Supply water temperature to the radiators should be in the range 55ºC return at 50ºC</td></tr>
<tr><td>Installation</td><td>A pressurised water distribution system with expansion vessel is to be employed
Works to be undertaken by a F-Gas Plumber so qualified to undertake the works as described.</td></tr>
<tr><td>Domestic hot water</td><td>The domestic hot water system will include a tank thermostat and a time clock to optimise the time taken to heat the water</td></tr>
<tr><td>Controls</td><td>As required by the Supplement to Part L</td></tr>
</table></td></tr>
<tr><td>Insulation of hot water storage vessels, pipes and ducts</td><td>Insulation of primary stores. Because of the higher than normal storage temperatures in primary stores shall be insulated to meet or exceed the following standards
Standards BS 1566: 2002 Copper indirect cylinders for domestic purposes. Open vented copper cylinders. Requirements and test methods
BS 7206:1990 Specification for unvented hot water storage units and packages
Heating pipework
All pipes where not in the thermal envelope shall be insulated.
BS 5422:2001 Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range of –40°C to +700°C
BRE Report No 262 Thermal insulation: avoiding risks, 2002 edition
Where insulation is labelled as complying with the Heating and Domestic Hot Water Systems for dwellings-Achieving Compliance with Part L it must not exceed the following heat loss levels:
<table>
<tr><th>Pipe diameter (OD) mm</th><th>Maximum permissible heat loss (W/m)</th></tr>
<tr><td>8mm</td><td>7.06</td></tr>
<tr><td>10mm</td><td>7.23</td></tr>
<tr><td>12mm</td><td>7.35</td></tr>
<tr><td>15mm</td><td>7.89</td></tr>
<tr><td>22mm</td><td>9.12</td></tr>
<tr><td>28mm</td><td>10.07</td></tr>
<tr><td>35mm</td><td>11.08</td></tr>
<tr><td>42mm</td><td>12.19</td></tr>
<tr><td>54mm</td><td>14.12</td></tr>
</table></td></tr>
</table>

Method of Heating :	To be a HARP registered Heat Pump
Mechanical ventilation systems	Fans are to be on the SEAI register or SAP Appendix Q database, all fans other than room based non ducted type, shall be SPF of 1.5 W/l/s or better in energy usage, to table 3 of the Building Regulations Part L Heat exchangers shall be greater than 67% efficient
Space Heating and Hot Water Supply System Control	Space and water heating systems to be effectively controlled so as to ensure the efficient use of energy by limiting the provision of heat to that required to satisfy the user requirements. The design intent is to provide the following minimum level of control; • Automatic control of space heating on the basis of room temperature • Automatic control of heat input to stored hot water on the basis of stored water temperature • Separate and independent automatic time control of space heating and hot water • Shut down of boiler or other heat source when there is no demand for either space or water heating from that source It is proposed to use a control system with full time and temperature control in each occupied room
Low Flow Sanitary Ware	Water efficient showers, taps, wash hand basins and baths to be employed. The installation of flow restrictors is required. Good practice would include: • Shower – 6L/min • Bath Volumes – Can vary but 175-130 L would be usual. 150L would be a recommended design target. These figures will be confirmed when the software officially becomes available
Lighting Design	A focus on lighting design will be another new aspect of the DEAP4 software where it is expected that credit will be given for an appropriate LED lighting design in relation to the dwelling. In the case of a deprived or over-elaborated lighting design spec, there will be a penalty for the building energy rating. A full lighting design analysis using appropriate software i.e. Dialux or Relux can help create a balanced lighting design.

7 CONSTRUCTION QUALITY AND COMMISSIONING OF SERVICES

The building and its services shall be continuously monitored and adjusted on an on going basis but formally at three stages during the build.

- Stage 1 is at the end of the trial dwelling type where all methods of installation shall be adjusted to meet the required standards and best installation practices before being applied to all areas of the build.
- Stage 2 is a formal first fix walk down, snagging and reporting to Building Control Authority.
- Stage 3 is a formal second fix walk down, snagging and reporting to Building Control Authority.
- Commissioning of Services shall occur and be witnessed by the Site Engineers as per contract specifications and in accordance with CIBSE , IS10101, IS3218, IS3217, BSRIA etc. requirements.

7.1 INSULATION CONTINUITY AND AIR PERMEABILITY

Shall be monitored by the Architect and reported accordingly in accordance with the methodology outlined above.

7.2 THERMAL BRIDGING

All thermal bridging shall be kept to a minimum and to the Approved Construction Details for the relevant elements of the build.

7.3 AIR PERMEABILITY PRESSURE TESTS

All Dwellings shall be air sealed and tested as per the requirements of Part L. It should be noted that the details being employed shall so ensure that the air permeability of the building is better than that noted in the Part L.

8 USER INFORMATION

At the end of the project all relevant information will be published online with a link to the information being provided to each dwelling owner.

It shall comprise of but not limited to,

- Drawings of the unit(s)
- Details of the products used in the unit(s)
- Details of operation of same
- Wiring test reports and certifications
- Fire Alarm test reports and certifications
- Emergency Lighting test reports and certifications
- Plumbing test reports and certifications
- Heat Pump test reports and certifications
- Public Health test reports and certifications for plumbing

These documents are typically entitled Operating and Maintenance (O&M) Manuals

9 SOLAR PV CELLS

Following amended calculation procedure in the DEAP software the estimated solar panels for apartments and houses has been determined based on the data as presented.

The final air tightness, plant efficiency of the final equipment as installed along with the calculation version at time of BER assessment will affect the total number of panels per dwelling.

The numbers presented herein are for the purposes of completeness only as the final BER will dedicate the final numbers to be applied, it is expected that the numbers per dwelling will not increase from the samples below.

Appendix 2 outlines a basic solar PV model as employed by SEAI, DEAP calculation method.

10 CRECHE

The Creche is to achieve a nZEB rating of A3, using commercial NEAP as published by SEAI, it is to be heated by heat pumps with Solar PV Cells on the roof, covering up to 60% of the area of the roof as is typical for buildings of this type and energy classification.

Ventilation will be subject to current guidance relating to airborne infection control at the time of BER assessment, as the national advice is in flux, the energy used will not be determined until final design is completed. At time of writing, 3 Air Changes Per hour, heat recovery ventilation unit(s) is proposed.

11 DISTRICT HEATING

District heating was not considered as the changes in the Part L and the need to provide nZEB houses has as a result of estimated calculations resulted in appox. 1,581 solar panels (PV) each producing 350W of power per hour for a total of 474KW, for 10hour day this is 4.74 MW of electrical power per day.

The final energy produced will be subject to further design development and final load calculations.

APPENDIX 1 – PV CALCULATIONS

- SEAI DEAP CALCULATION MODEL
- AVERAGE CALCULATION FOR BLOCKS AND TYPICAL PLANS TYPES, SUBJECT TO FULL SOLAR PV ANAYLSIS AS PER SEAI REQUIREMENTS

PV Calculations, subject to Final BER Calculations **SEAI PV CALCULATION METHOD** **Kelland Homes: Clonburris**

Unit Description	Qty.	Beds	Average Orientation	Watts per Panel	Nr of Panels	kWp	S (KW/yr)	Zpv	Result (KW/yr)	Total Panels	Total for Units (KW/yr)
A1 3 Bedroom, Gable End Unit	42	3 Bed	E/W	320	6	1.92	929	1	1427	252	59,932
A2 3 Bedroom, Mid terrace	39	3 Bed	E/W	320	6	1.92	929	1	1427	234	55,651
A3 3 Bedroom, Gable End Unit	6	3 Bed	E/W	320	6	1.92	929	1	1427	36	8,562
B 3 Bedroom, Mid terrace	19	3 Bed	E/W	350	6	2.1	929	1	1561	114	29,654
C 4 Bedroom, Semi Detached	12	3 Bed	South	350	8	2.8	1036	1	2321	96	27,848
Block A											
One Bed Apartment	14	1 Bed	South	350	4	1.4	1036	1	1160	56	16,244
2 Bedroom Apartment	36	2 Bed	South	350	5	1.75	1036	1	1450	180	52,214
Block B											
One Bed Apartment	6	1 Bed	South	350	4	1.4	1036	1	1160	24	6,962
2 Bedroom Apartment	16	2 Bed	South	350	5	1.75	1036	1	1450	80	23,206
Duplex	104	2 Bed	South	350	5	1.75	1036	1	1450	520	150,842
Creche	1	500sqm	South	350	60	21	1036	1	17405	60	17,405
Retail	1	150sqm	South	350	40	14	1036	1	11603	40	11,603
Total	**294**				**55**					**1,692**	**460,122**

Notes

All PV Calculations are based on most likely PV panels at Final BER stage

Most Average Orientation has been applied

Total results are plus or minus 15% of presented figure

All PV Calculations are based on SEAI formulas