Proposed Strategic Housing Development, 'Kenelm', Deer Park, Howth, Co. Dublin

Energy Statement

Application Issue

May 2021

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PREVIOUS ISSUES (Type Names)				
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P1	28th May 2020	Jamie Molony	PJ Ryan	Pre-Planning Issue
P2	20th October 2020	Jamie Molony	PJ Ryan	Pre-Planning Issue
P3	26 April 2020	Gavin Murphy	PJ Ryan	Pre-Planning Isue

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1. Introduction

This Energy Statement prepared by Ethos Engineering is submitted in support of a Strategic Housing Development application to An Bord Pleanala on lands at Deer Park, Howth, Co. Dublin.

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.

This report also addresses how the proposed development will comply with NZEB (Part L 2019 Dwellings). The principles underpinning Part L compliance are energy demand reduction through passive measures and increased supply from renewable and efficient sources. The proposed design will follow this principle.

1.1. Site and Building Summary

The design rationale is to create and deliver a high quality, sustainable, strategic housing development which respects its setting and maximises the site's natural attributes while achieving maximum efficiency of existing infrastructure. The Proposed Site Layout is illustrated on **Drawing No. 1101** contained within the architectural suite of drawings.

The development will consist of;

i. 162 no. residential units distributed across 3 no. blocks (A, B & C) ranging in height from 5-6 storeys, with a cumulative gross floor area (GFA) of 13,337.10 sq.m comprising;
   a. 29 no. 1-bedroom units, - 17.9%
   b. 104 no. 2-bedroom units and – 64.2%
   c. 29 no. 3-bedroom units – 17.9%

ii. 3 no. resident services and amenity rooms (1 no. in each block A-C) to accommodate co-working space, a community room and a meeting room (combined GFA 108 sq.m)

iii. 132 no. car parking spaces at basement level (underlying Blocks A & B) including 6 no. accessible spaces, 13 no. electric vehicle spaces and 4 no. car sharing spaces;

iv. 325 no. residents bicycle parking spaces (long-stay) at basement level, and 30 no. visitor bicycle parking spaces (short-stay) at surface level;

v. communal amenity space in the form of courtyards and roof gardens (combined 2,192 sq.m)

vi. public open space of 1,161 sq.m including a botanic garden and pocket park;

vii. a single storey ESB sub-station and switch room (45.5 sq.m);

viii. demolition of 2 no. sections of the existing demesne northern boundary wall to provide, a primary access (vehicular/pedestrian/cyclist) to the northwest and a separate pedestrian/cyclist access to the northeast;

ix. restoration and refurbishment of the remaining extant northern and eastern demesne boundary wall;

x. change of use and regrading of part of the Deer Park Golf Course from active recreation use to passive amenity parkland and planting of a woodland belt on the southern boundary;

xi. undergrounding of existing ESB overhead lines, and, relocation of the existing gas main; and,

xii. all ancillary site development works including waste storage and plant rooms at basement level, drainage, landscaping/boundary treatment and lighting.

The development will meet or exceed where feasible the requirements of the Part L 2019 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 DEAP (Dwellings Energy Assessment Procedure) methodology.

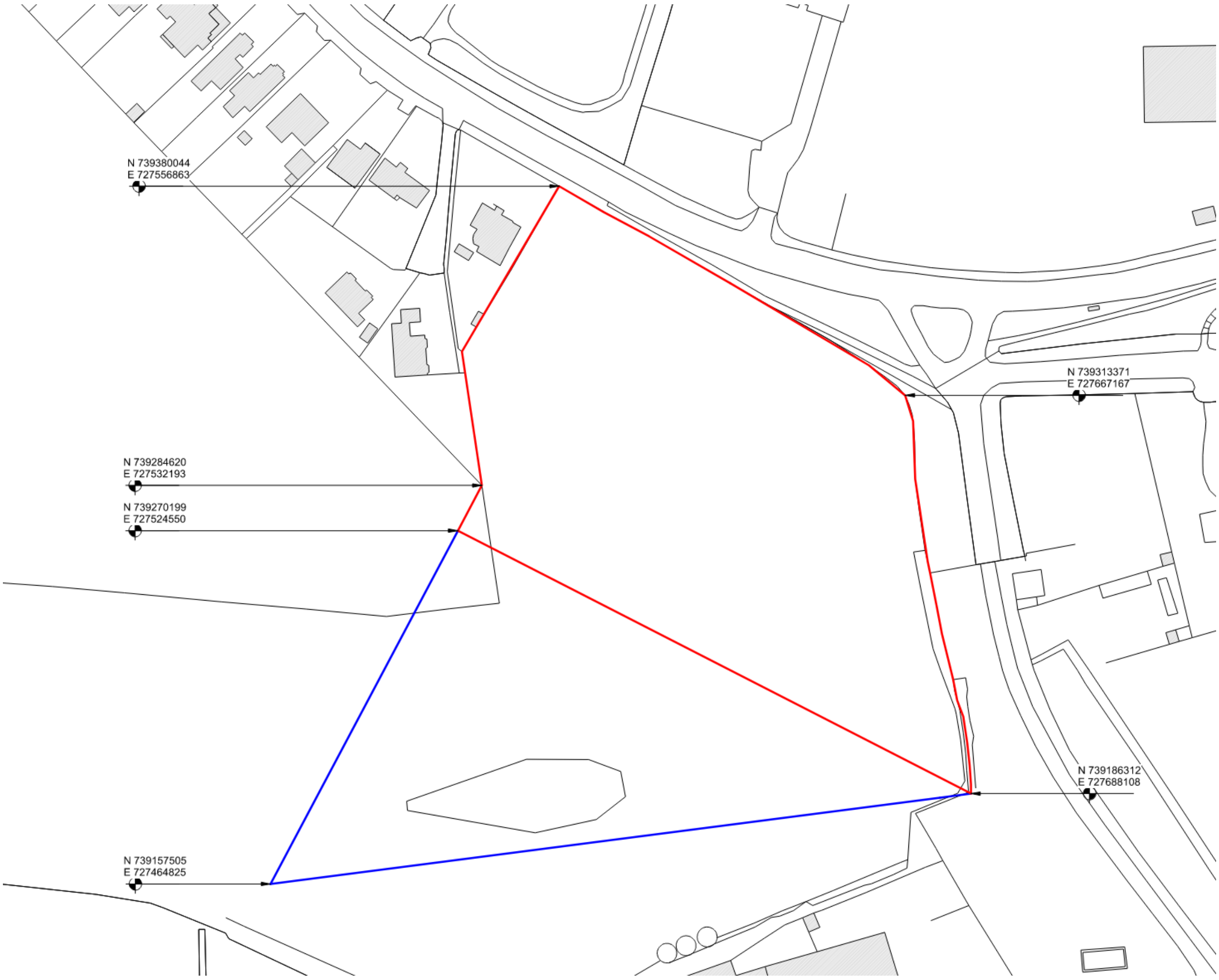

Figure 1: Site layout and location

2. Legislative/Planning Requirements

2.1. Part L

Technical Guidance Document Part L 2019 – Conservation of Fuel and Energy – Dwellings (public consultation edition)' (referred to in this document as "Part L or NZEB") stipulates requirements on, minimum fabric and air permeability requirements, maximum primary energy use and carbon dioxide (CO_2) emissions as 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:

1. The limitation of primary energy use and CO_2 emissions
2. Building fabric
3. The use of renewable energy sources

2.1.1. Limitation of Primary Energy Use and CO_2 Emissions

In order to demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated Energy Performance Coefficient (EPC) will be no greater than the Maximum Energy Performance Coefficient (MEPC). The MPEPC is 0.30.

To demonstrate that an acceptable CO_2 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). The MPCPC is 0.35.

2.1.2. Building fabric

In order to limit the heat loss through the building fabric the thermal insulation for each of the plane elements of a new dwelling must meet or better the area weighted average elemental U-Values (Um) as specified by Part L, listed in Table 1 (column; Part L 2019).

Table 1: Fabric U Values Comparison Part L 2011 vs Part L 2019

Element	U-value (W/m^2.K)	U-value (W/m^2.K)
	Part L 2011	Part L 2019 (NZEB)
Pitched Roof (Insulated on slope or ceiling)	0.16	0.16
Flat Roof	0.20	0.20
Walls	0.21	0.18
Ground Floors	0.21	0.18
Exposed floors	0.21	0.18
External doors, windows and roof lights	1.60	1.40

2.1.3. Use of Renewable Energy Sources

In order to comply with NZEB, dwellings must conduct a comparative analysis for specified renewable technologies to demonstrate compliance with Regulation L3 (b).

Renewable Energy Ratio (RER) is the ratio of the primary energy from renewable energy sources to total primary energy as defined and calculated in DEAP. The following represents a very significant level of energy provision from renewable energy technologies in order to satisfy Regulation L3 (b).

Where the MPEPC of 0.3 and MPCPC of 0.35 are achieved, a RER of 0.20 represents a very significant level of energy provision from renewable energy technologies

2.2. Nearly Zero Energy Buildings (NZEB)

2.2.1. About NZEB Standard

The European Energy Performance of Buildings Directive Recast (EPBD) requires all new buildings to be Nearly Zero - Energy Buildings (NZEB) by 31st March 2020. This means that any building completed after these dates must achieve the standard irrespective of when they were started.

'Nearly Zero - Energy Buildings' means a building that has a very high energy performance, Annex 1 of the Directive and in which "the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby"

2.2.2. Implementation of NZEB in Ireland

Each member State has discretion in how the standard is applied nationally. To comply with the NZEB requirement, the Irish Government has amended the 2011 Part L to include the following paragraphs:

'In order to achieve the acceptable primary energy consumption rate for a nearly zero energy dwelling, the calculated energy performance coefficient (EPC) of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC for a nearly zero energy dwelling is 0.30.

To demonstrate that an acceptable CO2 emission rate has been achieved for a nearly zero energy dwelling, the calculated carbon performance coefficient (CPC) of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). The MPCPC for a nearly zero energy dwelling is 0.35.'

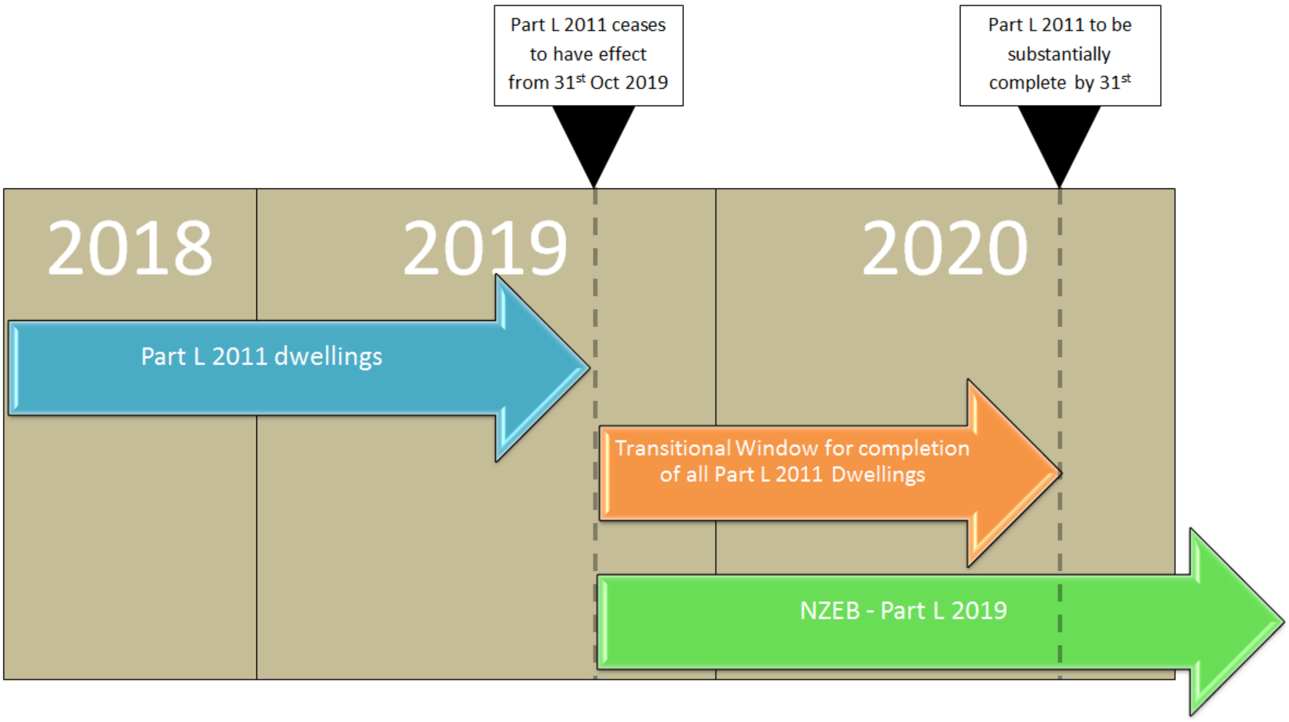

Figure 2: NZEB Transitional arrangement

2.3. Fingal Development Plan 2017-2023

The Energy Strategy will consider the council policies and objectives as outlined in the Fingal development plan 2017-2023.

- Objective EN04: Encourage development proposals that are low carbon, well adapted to the impacts of Climate change and which include energy saving measures and which maximise energy efficiency through siting, layout and design.
- Objective EN09: Require details of the requirements for alternative renewable energy systems, for buildings greater than 1000sq m or residential schemes above 30 units, under SI 243 of 2012 European Communities (Energy Performance of Buildings) to be submitted at pre planning stage for consideration. These should take the form of an Energy Statement or Feasibility Study carried out by qualified and accredited experts

3. Part L Compliance

The proposed development will meet or exceed where feasible the requirements of Part L. Apartments have been assessed using the Sustainable Energy Authority of Ireland (SEAI) DEAP 4.1 (beta) software which demonstrates Part L compliance. Software inputs and outputs are summarised in section 5 of this report.

3.1. Building Fabric

In order to limit the heat loss through the building fabric of the proposed apartments the thermal insulation for each of the plane elements of the development will meet or better the area weighted average elemental U-Values (Um) as specified by Part L. Table 1 lists the Part L area weighted average elemental U-Values and the targeted U-Values of the proposed design.

Table 2: Fabric U Values

Element	U value (W/m^2.K)	
	Part L 2019 (NZEB)	Targeted
Pitched Roof	0.16	0.16
Flat Roof	0.20	0.15
Walls	0.18	0.18
Ground Floors	0.18	0.15
Exposed floors	0.18	0.15
External doors, windows and roof lights	1.40	1.30
Glazing gv (EN410)		*0.4-0.6

* pending overheating calculation

3.2. Thermal Bridging

To avoid excessive heat losses and local condensation problems, consideration will be given to ensure continuity of insulation and to limit local thermal bridging, e.g. around windows, doors and other wall openings, at junctions between elements and other locations.

Acceptable Construction Details will be adopted for all key junctions where appropriate (i.e. typical/standard junctions). For all bespoke key junctions certified 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 associated with thermal bridges is taken into account in the DEAP methodology and can heavily impact the calculated energy use and CO_2 emissions. In general this is done by including an allowance for additional heat loss due to thermal bridging, expressed as a multiplier (Ψ, psi) applied to the total exposed surface area or by the calculation of the transmission heat loss coefficient H_{TB}. A default Ψ value of 0.15 is applied in DEAP; the proposed design is targeting a Ψ value of at least 0.08 or equivalent H_{TB} value.

3.3. Building Envelope Air Permeability

In addition to fabric heat loss/gain, considerable care will be taken during the design and construction to limit the air permeability (Infiltration). High levels of infiltration can contribute to uncontrolled ventilation.

Part L requires an air permeability level no greater than $5m^3/m^2/hr$ @ 50Pa for a new dwelling; which represents a reasonable upper limit of air tightness. The design intent for the proposed apartments and houses will be to target an air permeability of $2m^3/m^2/hr$ @ 50Pa.

Air permeability testing will be carried out by a person certified by an independent third party (National Standards Authority of Ireland or equivalent certification body) in accordance with I.S. EN 13829: 2000 "Thermal performance of buildings: determination of air permeability of buildings: fan pressurisation method". All apartments will be tested in this way.

3.4. Building Services

3.4.1. Heating Appliance Efficiency

Regulation L3 (d) requires that space heating and water heating systems in dwellings are energy efficient, with efficient heat sources and effective controls. More specifically, Regulation L3 (e) provides that oil and gas fired boilers must achieve a minimum seasonal efficiency of 90%.

The proposed design for the apartments are to generate heat for space heating and domestic hot water (DHW) by using Exhaust Air Heat Pumps (EAHPs).

In relation to apartments and houses, heating will be provided to the space by appropriately sized radiators or low temperature radiators which operate at lower flow and return temperature.

3.4.2. Space Heating and Hot Water Supply System Control

Space and water heating systems should 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

We propose to use a control system with full time and temperature control in each occupied room

3.4.3. Insulation of Hot Water Storage Vessels, Pipes and Ducts

All hot water storage vessels, pipes and ducts (where applicable) will be insulated to prevent heat loss. Adequate insulation of hot water storage vessels will be achieved by the use of a storage vessel with factory applied insulation tested to BS 1566, part 1:2002 Appendix B. Water pipes and storage vessels in unheated areas will be insulated for the purpose of protecting against freezing. Technical Guidance Document G and Risk report BR 262, Thermal insulation avoiding risks, published by the BRE will be followed.

3.4.4. Low Flow Sanitary Ware

The updated version for assessing the building energy rating now gives credit for water efficient showers, taps, wash hand basins and baths. The installation of flow restrictors is recommended. 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.

3.4.5. Lighting Design

Based on DEAP 4.2 there is a now a more focused emphasis on lighting in which credit will be given for anappropriate 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.

3.4.6. User Information

After the completion of the proposed Development the end user(s) will be provided with sufficient information about the building, its installed services and their maintenance requirements so that the Apartments can be operated in line with their optimum operation for energy efficiency.

3.5. Use of Renewable Energy Sources

The following low & zero carbon technologies were reviewed in terms of their applicability for this development;

- Wind Power
- Photovoltaic Cells (PV)
- Solar Thermal Collectors
- Biomass Heating
- Ground Source Heat Pumps (GSHPs)
- Air Source Heat Pumps (ASHPs)
- Exhaust Air Heat Pumps (EAHPs)
- Combined Heat & Power (CHP)

Technology	Feasibility			Comments
	High	Medium	Low	
Micro Wind 			√	**Technology Description:** Micro wind turbines can be fitted to the roof of a building but would contribute a negligible amount of energy to the development. **Applicability to this Development:** Due to limited outputs and more viable solutions, this renewable has not been deemed viable. Vertical axis wind turbines may be more suited to this building, but there would still be the obvious aesthetic and potential noise issues.

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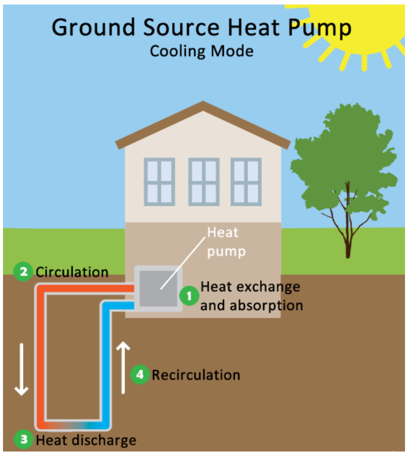
Technology	Feasibility			Comments
	High	Medium	Low	
Wind Power 			√	**Technology Description:** Mast-mounted wind turbines can be located in an open area away from obstructions such as buildings and tall trees. **Applicability to this Development:** Due to the size of the turbines and proximity residential buildings it is deemed that a large wind turbine installation is not feasible.
Solar Photovoltaic (roof mounted) 		√		**Technology Description:** Photovoltaic (PV) Cell technology involves the conversion of the sun's energy into electricity. PV panels can be discrete roof-mounted units or embedded in conventional windows, skylights, atrium glazing, façade cladding etc. **Applicability to this Development:** Residential developments can be suitable locations for the installation of PV depending on orientation roof pitch and over-shading while also being virtually maintenance free. PV is not proposed for the development as the renewable energy objectives are being achieved with other technologies.
Solar hot water systems 			√	**Technology Description:** Active solar hot water technology uses the sun's thermal radiation energy to heat fluid through a collector in an active process. **Applicability to this Development:** Due to the maintenance factor surrounding solar panels a solar hot water system is not considered feasible at this site.

Technology	Feasibility			Comments
	High	Medium	Low	
Biomass Heating 			√	**Technology Description:** Biomass boilers work on the principle that the combustion of wood chip or pellets can create heat for space heating and hot water loads. **Applicability to this Development:** This technology requires substantial space allowance in a boiler room, access for delivery trucks, a thermal accumulator tank and considerable space for fuel storage of wood chips or pellets. The system also requires regular maintenance to remove ash etc. The use of biomass calls for a continuous local supply of suitable fuel to be truly sustainable. Concerns exist over the level of NOx and particulate emissions from biomass boiler installations, particularly in urban areas.
Ground source heat pump (GSHP) 			√	**Technology Description:** GSHP technologies exploit seasonal temperature differences between ground and air temperatures to provide heating in the winter and cooling in the summer. GSHP systems use some electricity to run the heat pump, but as most of the energy is taken from the ground, they produce less greenhouse gas than conventional heating systems. Ground source heat systems deliver low temperature heat and high temperature cooling, suitable for underfloor heating or chilled beams. **Applicability to this Development:** Site restrictions would require the use of vertical boreholes as opposed to horizontal ground loops. GSHP is not being proposed for this site as the renewable energy objectives are being achieved with other technologies Additionally capital costs are high and ideally, there should be a good balance between heating and cooling loads to allow for high COPs and reasonable capital payback. While a well-designed GSHP system operating under favourable conditions can achieve good efficiencies, the capital cost difference may still outweigh potential energy savings. As there is no cooling load, this investment is not deemed viable

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Technology	Feasibility			Comments
	High	Medium	Low	
Air source heat pump (ASHP) 	√			**Technology Description:** ASHP technologies exploit seasonal temperature differences between external air and refrigerant temperatures to provide heating in the winter and cooling in the summer. ASHP systems use more electricity to run the heat pump when compared to GSHP, but as most of the energy is taken from the air, they produce less greenhouse gas than conventional heating systems over the heating season. Their COP can reduce to below 2.0 when outside air temperatures are ≤0°C and they can require additional energy for a defrost cycle. **Applicability to this Development:** Heat pumps are generally safer than the combustible based heating systems and have a relatively low carbon footprint. Heat pumps can deliver heat at low outside temperatures which can be considered suited to the Irish climate. For this reason ASHP has been deemed suitable for the proposed development for the provision of space heating and is proposed for the landlord heating system.
Exhaust Air source heat pump (EAHP) 	√			**Technology Description:** The exhaust air heat pump uses otherwise wasted heat in the warm air areas of your home (bathrooms, kitchen, utility..) and transfers that heat to hot water using the same principles as air source and ground source heat pumps. An Exhaust Air Heat Pump (EAHP) extracts heat from the exhaust air and transfers the heat to domestic hot water and/or hydronic heating system (underfloor heating or radiators).This type of heat pump requires a certain air exchange rate to maintain its output power. Since the inside air is approximately 20-22 degrees Celsius all year round, the maximum output power of the heat pump is not varying with the seasons and outdoor temperature **Applicability to this Development:** Exhaust Air Heat Pumps are best suited to apartments which will have low fabric heat losses such as these. The latest units with inverter controlled compressor also have a ducted outside air supply which means the unit can draw on outside air when extract rates are low but without the need for an external condenser unit. EAHP are proposed for the apartments in this development.

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Technology	Feasibility			Comments
	High	Medium	Low	
Combined Heat and Power (CHP) 	√			**Technology Description:** Combined heat and power (CHP), also known as co-generation, is the simultaneous generation of both useable heat and electrical power from the same source. A CHP unit comprises of an engine (referred to as the prime mover) in which fuel is combusted. The mechanical power produced by the engine is used to generate electricity using an integral electrical generator. The heat emitted from the engine (waste heat) is used to provide space heating and domestic hot water **Applicability to this Development:** CHP systems can be used in applications where there is a significant year-round demand for heating in addition to the electricity generated. However as there is limited heating demand during summer outside of the apartments, CHP is not proposed as the renewable energy objectives are being achieved with other technologies

4. Passive Design

A focus for this project is to operate the building with low energy consumption. The building will be designed to minimise/avoid the requirements for mechanical ventilation and/or air conditioning. This will be done with the use of passive systems to control the internal environment, where possible.

This will be further developed with the client, architect, structural engineer and cost consultant as the scheme develops. The passive systems will aim to reduce external noise and pollution, reduce heat loss (in winter), reduce solar gains (in summer), and maximum daylight while maintaining comfort conditions.

4.1. Natural Ventilation

Natural ventilation for purge ventilation will be incorporated via either single sided or cross ventilation. Where natural ventilation cannot provide the comfort and air quality needs of the occupants or the space and mechanical ventilation cannot be avoided, these systems will incorporate energy efficient solutions to maximise the efficiency of the systems through the use of heat recovery and the efficient controls. This will be fully assessed during detailed design in accordance with procedures in CIBSE TM59 – 'Design methodology for the assessment of overheating risk in homes'.

For dwellings that incorporate mechanical solutions as in paragraph 4.2 below, it should be noted that these systems will not be sufficient to prevent summertime overheating alone. CIBSE TM59 states that 'homes that are predominantly naturally ventilated, including homes that have mechanical ventilation with heat recovery (MVHR), with good opportunities for natural ventilation in the summer should assess overheating using the adaptive method'. This will involve detailed consideration of openable windows and doors and testing the design for a number of typical worst case apartments using dynamic simulation software.

4.2. Exhaust Air Heat Pump

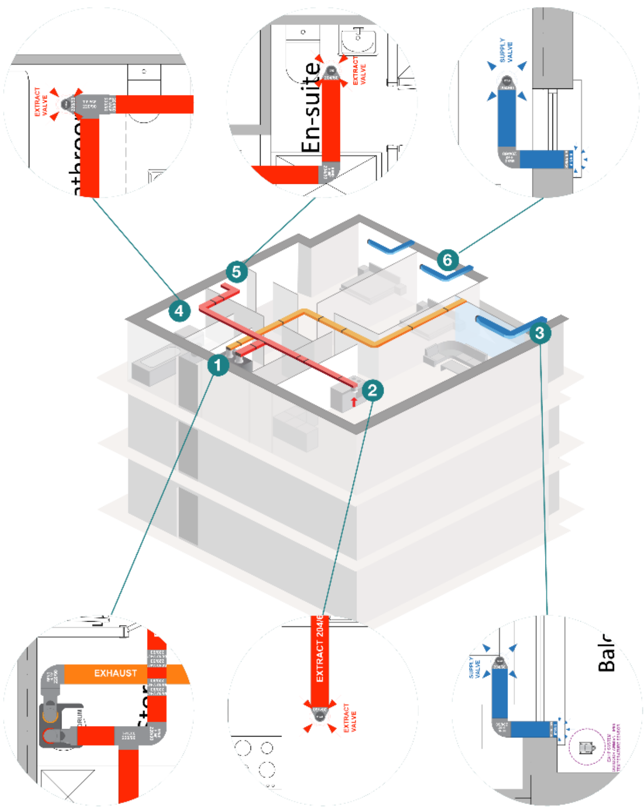

Figure 3: Exhaust Air Heat Pump Ventilation

The proposed system for apartments will use exhaust air heat pumps to draw fresh air in through passive wall ventilators in each habitable room to a mechanical extract in each bathroom, toilet, toilet and kitchen. This ensures there is permanent flow of background ventilation.

Openable windows are used for purge ventilation.

4.3. Balanced Whole House Mechanical Ventilation with Heat Recovery

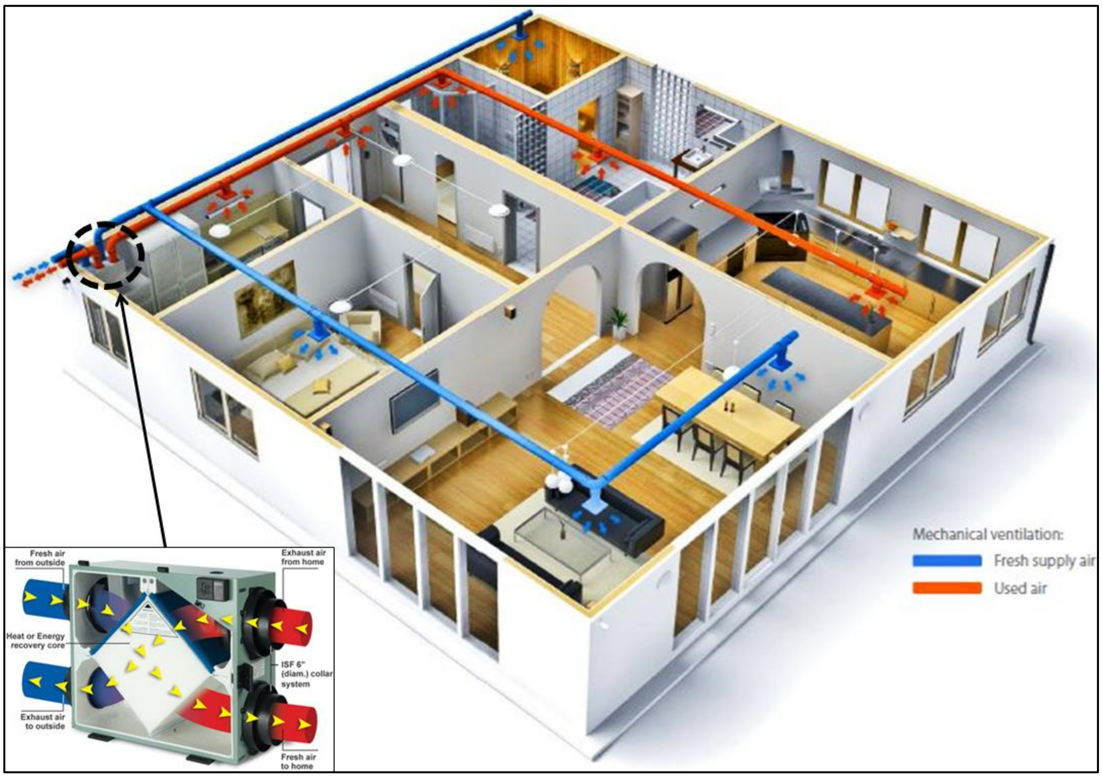

Figure 4: Balanced Whole house Mechanical Ventilation with heat recovery

The proposed system for Tenant amenities will use mechanical ventilation with heat recovery (MVHR).

Both air flows are to be ducted and driven by two fans, one on the supply side and one on the extract side. The mechanical extract fan will remove odours and excessive humidity to maintain a good air quality. A key component of the system is that a heat recovery unit is utilised to transfer heat from the warm exhaust air to the fresh air, achieving heat recovery.

The ventilation system should be listed on SAP appendix Q which ensures a suitable method of testing procedure for Irish use.

4.4. Passive Solar

Daylight in buildings creates a positive environment by providing connectivity with the outside world and assisting in the wellbeing of the building inhabitants. Daylight also represents an energy source; it reduces the need for artificial lighting, particularly in dwellings where natural light alone is often sufficient throughout the day. The design intent is to maximise the use of natural daylight to enhance visual comfort and not compromise thermal performance. The proposed development will have glazing specified that will minimise thermal conduction (u-value) while allowing for sufficient daylight levels and the maximisation of solar gain. Maximising solar gain within the limitations of thermal comfort will allow for a portion of the space heating load to be met passively during the day.

Refer to Daylight, Sunlight and Overshadowing Report prepared by 3D Design Bureau and submitted under separate cover for further information.

4.5. Water Conservation

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

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

5. DEAP Calculation Summary

DEAP calculations have been carried out using SEAI DEAP 4.2 software in order to demonstrate compliance with Part L 2019 for a sample apartment. The DEAP calculations are based on the following provisional inputs:

5.1. SEAI DEAP 4.2 Inputs – Apartment

- Wall U value = 0.18 W/m^{2}K
- Semi exposed walls = 0.23 W/m^{2}K (walls to unheated voids)
- Floor = 0.15 W/m^{2}K
- Roof = 0.15 W/m^{2}K
- Doors = 1.40 W/m^{2}K
- Glazing/Patio door = 1.30 W/m^{2}K (whole window unit inclusive of frame)
- Glazing gv (EN410) = 0.4-0.6 (subject to overheating study)
  - Frame Factor = 0.7 (i.e. 30% frame)
- Air permeability = 2 m^3/m^2/hr at 50 Pa
- Thermal bridging = 0.08 W/m^2.K
- Ventilation = Centralised MEV with heat recovery
- Specific Fan Power = 0.26 W/l/s
- Lighting = 100% Low energy
- Heating system = Exhaust Air source Heat pump
- Distribution system loss and gains;
  - Heating system category: Central heating systems with radiators or underfloor heating
  - Sub-category: Heat Pumps
  - Heating system: Air-Water heat pump (electric)
  - Heat Emitter Type: Fan coil/low temperature radiators only
  - Heating System Controls: Full Time and temperature zone control
  - Space heating system also supplies DHW: Yes
  - DHW Supplied by heat pump: All

5.2. Conclusions

5.2.1. Part L 2019 - Apartment compliance

This report confirms that the proposed development will comply with Part L regulations (NZEB). The report highlights that Part L will be achieved if applied as the report suggests. The strategies adopted for the development are outlined here:

- U-values for floor and roof will exceed the building regulation backstops
- Using Glazing U-Value target outlined in this report
- Better performance air permeability than the backstop, adding to building air tightness
- High performance thermal bridging
- Mechanical extract ventilation with heat recovery via heat pump
- Exhaust air source heat pump to provide space heating (via radiators) and domestic hot water
- Mechanical ventilation heat recovery and air source heat pump heating for the landlord areas and tenant amenities.

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ISO 9001:2008 EQA QUALITY ASSURED COMPANY
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